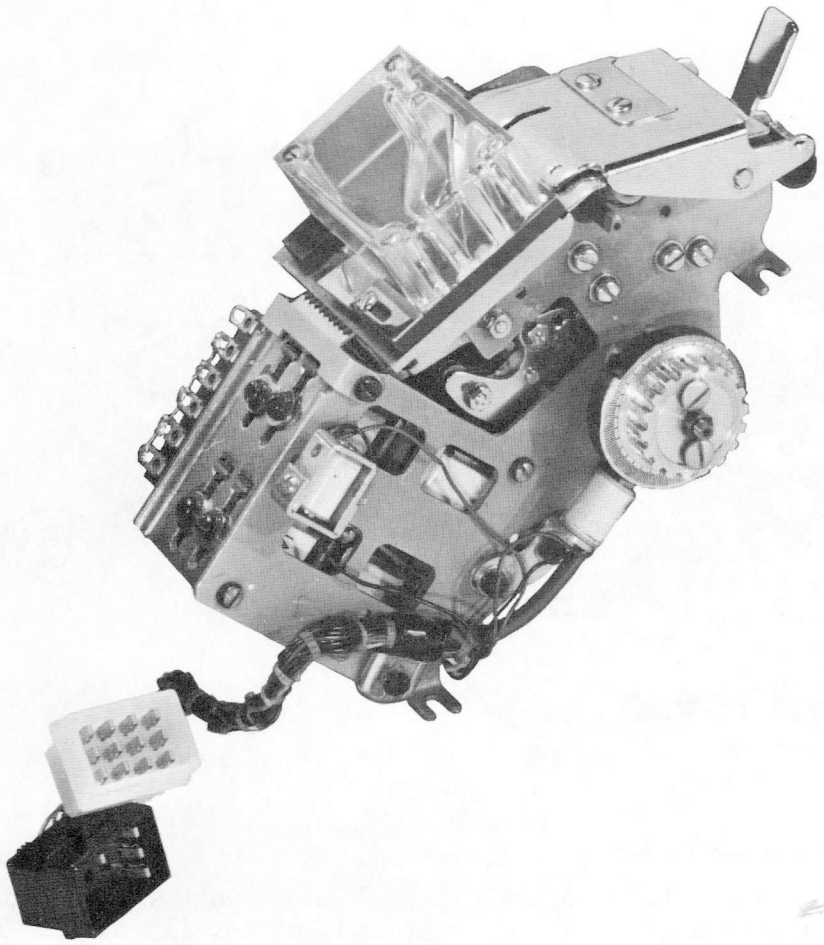
PUNCH BASIC MECHANISM



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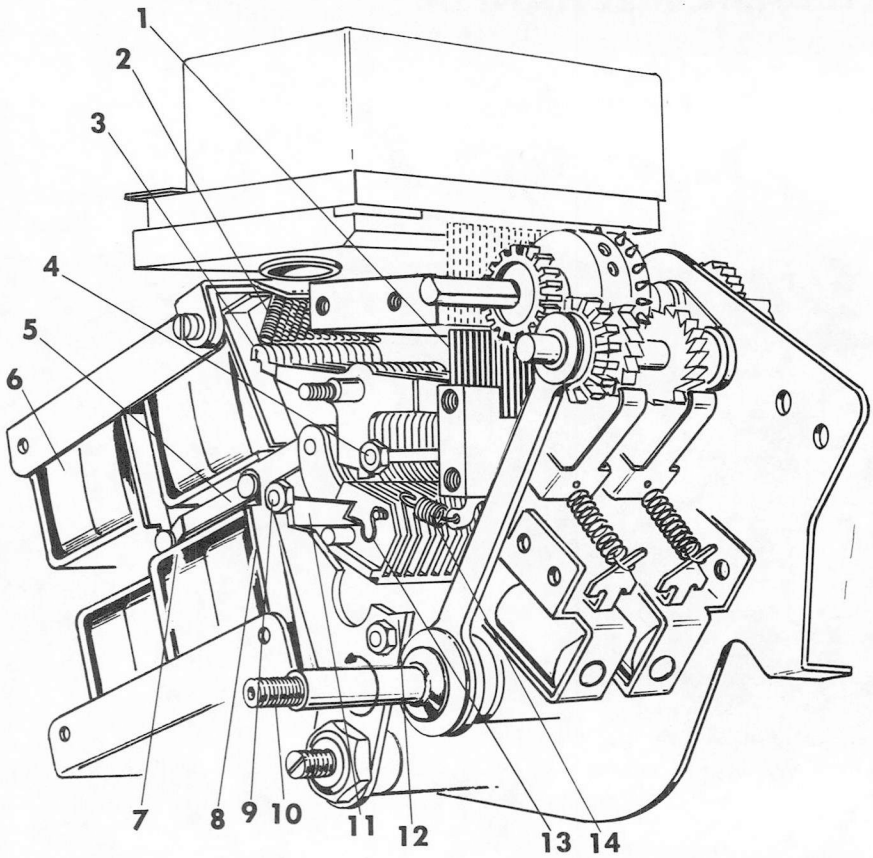
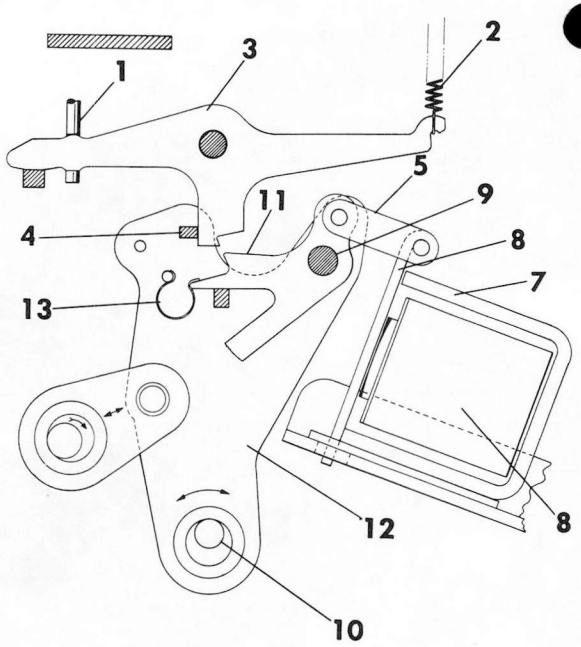
O.E.M. PRODUCTS DIVISION

AUTOMATED BUSINESS SYSTEMS, A DIVISION OF LITTON INDUSTRIES

600 WASHINGTON AVENUE, CARLSTADT, N. J. 07072





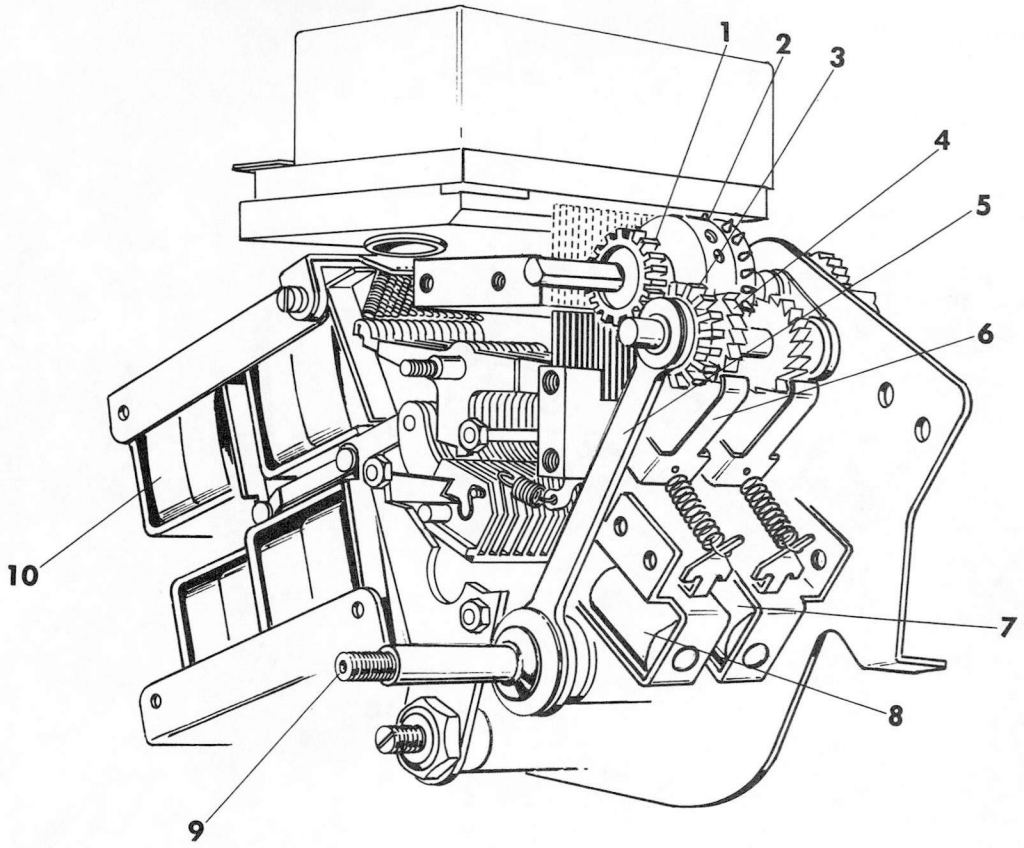
PUNCH - FUNCTION AND OPERATION

Input Eccentric Shaft (10) rotating in the direction indicated, imparts motion to Punch Pawl Yoke (12).

When a Punch Magnet (6) is energized while Punch Yoke (12) is moving to the rear of the Unit, the pulling action against Link (5) causes Punch Pawl (11) to pivot about Shaft (9). The end of the Punch Pawl moves up, against the tension of Over-Centering Spring (13). Once Pawl (11) is past center of Spring (13), the spring tension pushes Pawl (11) into contact with Punch Driver Arm (3).

As Yoke (12) and Pawl (11) continue to move rearward, Punch Driver Arms (3) pivot up and drive Punches (1) through the Tape to produce the perforated Code. Shaft (10) continues to rotate. Yoke (12) and Pawls (11) move to the front of the Unit and allow Springs (2) to pull Driver Arms (3) and Punches (1) out of the Tape. Just before Yoke (12) is fully to the front of the Unit, Armature (8) contacts Magnet Shell (7) and as Yoke (12) moves to its full forward position, the force from Armature (8) contacting Shell (7) through connecting Link (5), pushes Pawl (11) against Over-Centering Spring (13) until Pawl (11) is past center and the tension of Spring (13) returns Pawl (11) to its inactive position. Positive Retractor (4) insures the retraction of Punches (1) should Springs (2) fail to pull the Punches from the Tape. Subsequent rotation of Shaft (10) and energizing of Magnets (6) will repeat the punching operation.

Spring (14) eliminates excessive chatter during high speed movement of Yoke (12).



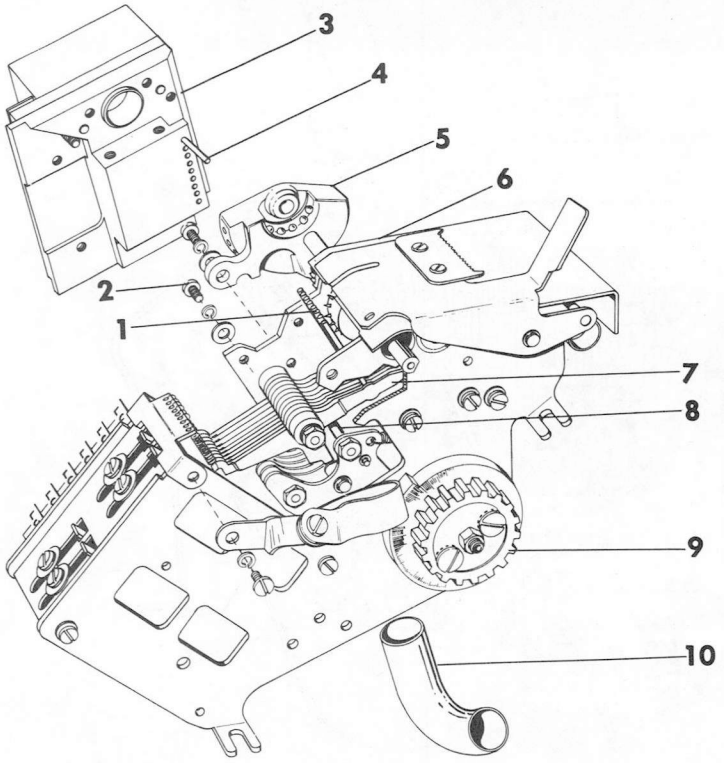
PUNCH - FUNCTION AND OPERATION - Continued

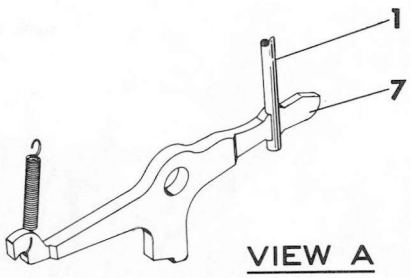
During the rotation of Eccentric Shaft (9), Index Link (5) moves up and down rolling Gear (3) over Gear (1). When the Punches are below the Platen level, Index Link (5) is at its highest point and Forward Index Magnet (8), when energized, brings Interposer (6) into contact with Ratchet (4).

Once Interposer (6) has stopped Ratchet (4) and Gear (3) from turning, the downward motion of Link (5) is transmitted to Gear (1) turning Gear (1) and Sprocket (2) one space.

When the Sprocket is fully advanced, Index Magnet (8) is de-energized and Interposer (6) returns by Spring tension to its inactive position. The rotation of Shaft (9) raises Link (5) to its highest point to repeat the preceding operation.

The Tape can be fed in the reverse direction by energizing Reverse Magnet (7). The Tape will feed the same way as described in Forward Feeding; however, the feeding occurs during the upward movement of Link (5). The Punching operation occurs at this time and it is, therefore, essential that Punch Magnets (10) are not energized during the Reverse Feed mode.





INDIVIDUAL PUNCH - REMOVAL AND REPLACEMENT

Removal

With the basic mechanism removed from the Unit, remove Chad Tube (10). Remove Ball Detent Assembly (5). Remove the four Punch Die Assembly Binding Screws (2) and carefully pull Punch Die Assembly (3) forward to clear Platen (6). Remove Punch Die Assembly from Unit.

End Punch (4) does not have an Arm adjacent to it and will fall from the Unit when the Punch Die Assembly (3) is removed.

The remaining Punches (1) may be removed by turning Pulley (9) until Positive Retractor (8) is as far rearward as possible. Raise Punch Driver Arms (7) and pull the Punches off the front of Arms (7).

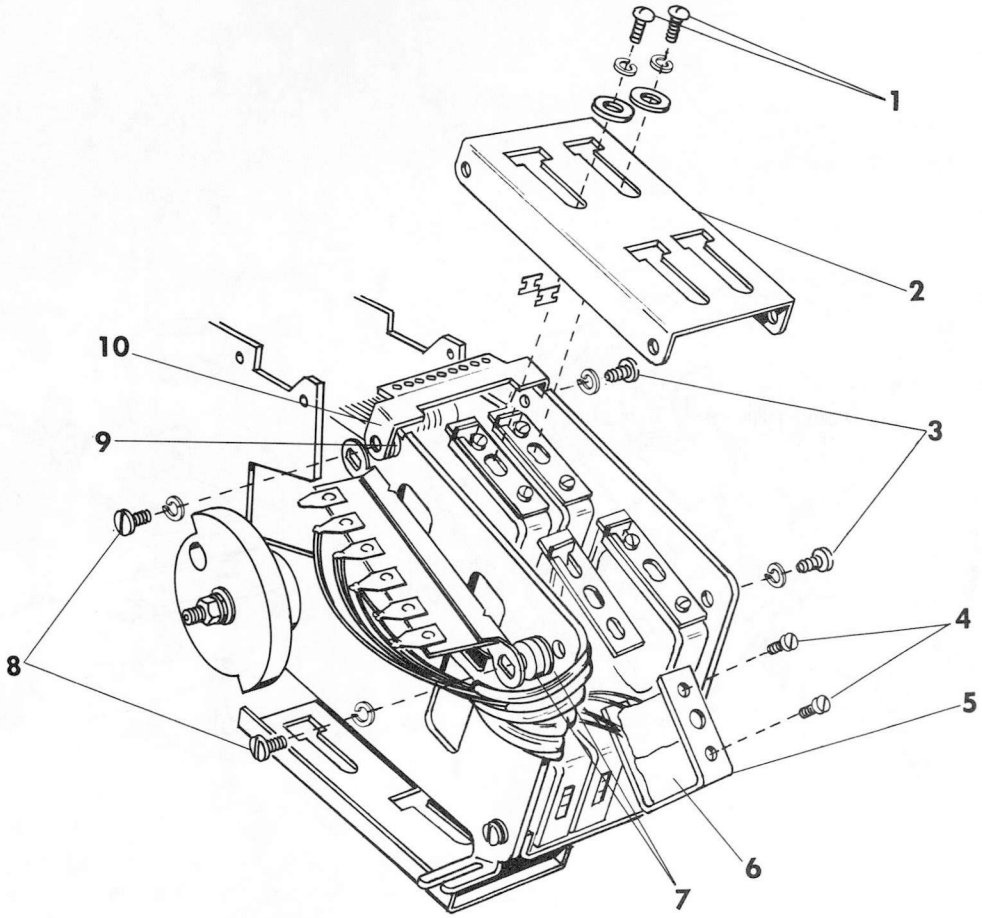
Replacement

With Positive Retractor (8) fully rearward raise Punch Driver Arm (7) and slide Punch (1) into position on Driver Arm (7) as illustrated in View A.

Place End Punch (4) into Punch Die Assembly (3), as illustrated, with the Punch Slot in the proper relation to its Driver Arm.

Position Punches (1) into Punch Die Assembly (3). Lower Punch Die Assembly into Unit and push End Punch (4) down into position over its Driver Arm.

Press the Punch Die Assembly into the Unit and slide it forward to engage Platen (5) with the Slot in Punch Die Assembly (4). Install Screws (2) and check Punches for freedom of movement. Install Ball Detent Assembly (5) and Chad Tube (10). Install the basic mechanism in the Unit.



PUNCH MAGNET - REMOVAL AND REPLACEMENT

Removal

Disconnect Leads to the Winding to be replaced. Remove Binding Screws (1) and (3). Note the amount and location of Spacers (7) and (9). Move Spring Anchor (10) forward and slide Plate (2) out of Unit. Punch Magnets (5) will now lie loose in the Unit and Windings (6) may be removed by removing Binding Screws (4).

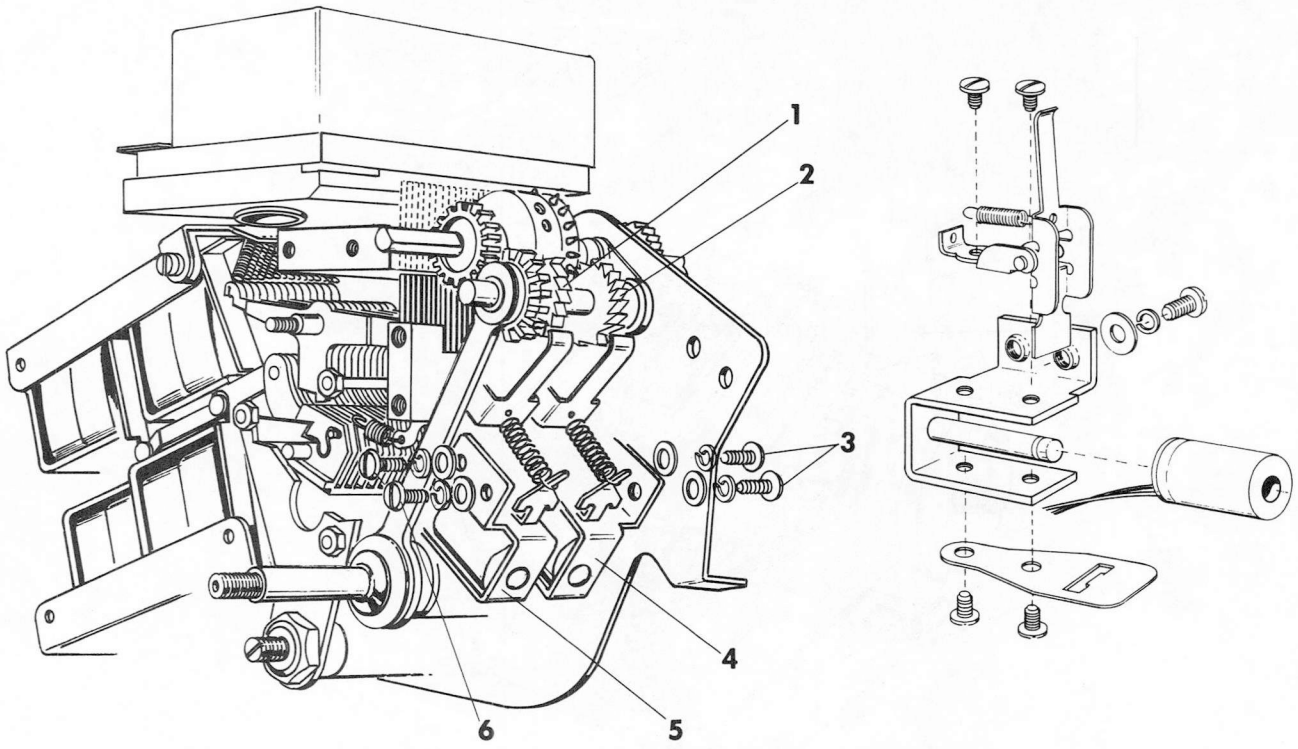
Replacement

Place replacement Winding on the Pole and install but do not tighten Binding Screws (4). Adjust the Punch Magnet Armature as described on Page PBM5-9 and tighten Screws (4).

Reconnect the Leads. Refer to the Schematic Wiring Diagram in the Electronic Section.

Install Plate (2), Spring Anchor (10) and Spacers (7) and (9). Secure with Binding Screws (3). Install but do not tighten Binding Screws (1). Adjust the Air Gap of the Punch Magnets as described on Page PBM5-9 and tighten Binding Screws (1).

Removal and replacement of Punch Magnet Windings, on the bottom of the Punch Unit, is identical to the above description.



INDEX MAGNET - REMOVAL AND REPLACEMENT

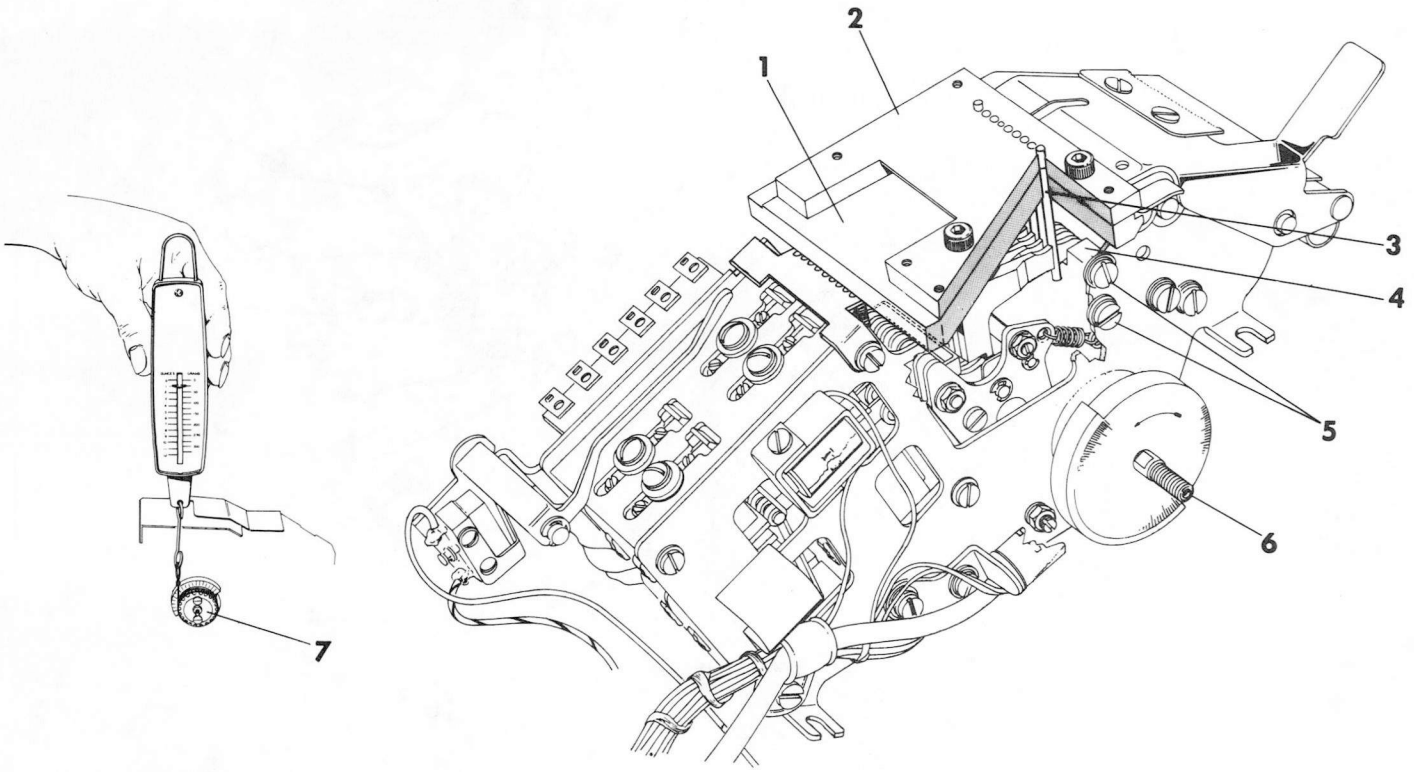
The Forward or Reverse Index Magnets (5) or (4) may be removed by removing Binding Screws (3) or (6) and disconnecting the respective Leads.

Once removed from the Unit, the Magnet Assemblies can be further dismantled as illustrated, for individual part replacement purposes.

Replacement

Position the Assembled Index Magnet in the Unit, in alignment with Feed Ratchets (1) or (2) and Base Side Holes. Install Binding Screws (3) or (6) and connect the Leads.

Adjust Index Magnets as described on Page PBM5-10 and tighten the Mounting Screws upon completion of the adjustment.



PUNCH - ADJUSTMENTS AND TIMING

Punch Position at Rest

Remove the Lucite Punch Cover and remove all Chad from Plate (2). Insert two Punch Pin Set Gauges 1B9-1031 (.203 length) in the number 1 and number 8 Die Plate Holes. Loosen Screws (5) on both sides of the Unit, and move Punch Driver Arm Guide (4) up or down until the Pins in the number 1 and 8 Holes are flush with the surface of Plate (2) and secure Screws (5).

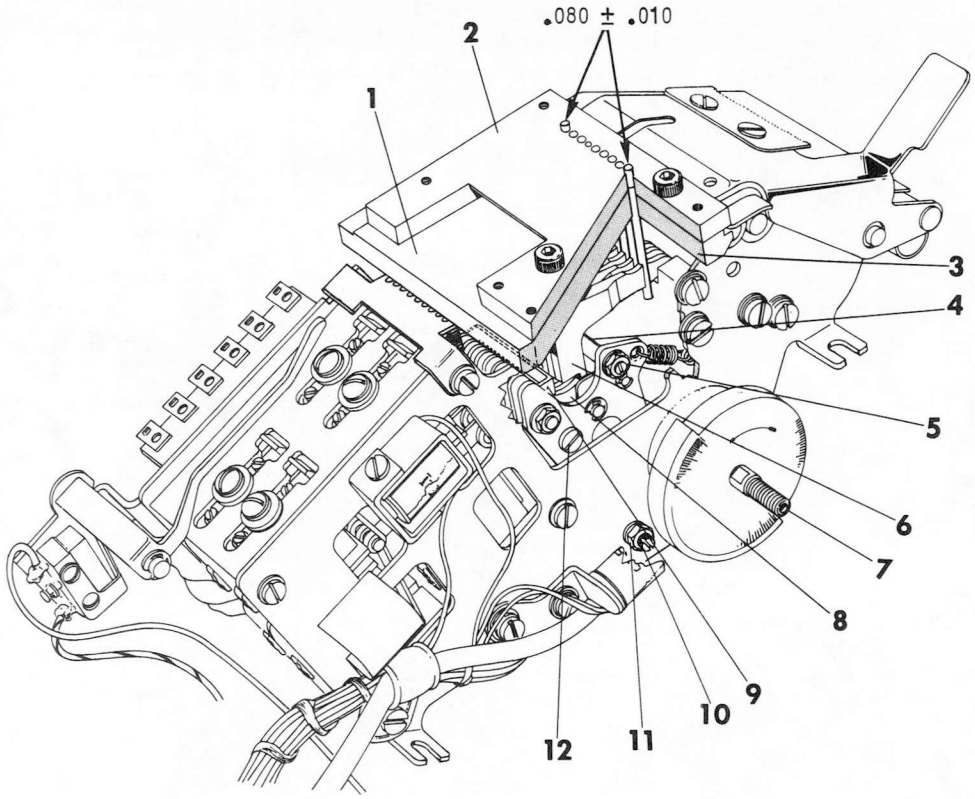
Prior to performing the following calibration, check the Main Shaft Torque by winding a string around Pulley (7) and attach the Pull Scale to the String as shown. Pull the Scale rotating the Main Shaft. The Main Shaft Torque is correct when the Scale reads 5 to 7 ounces.

Calibration of the Timing Dial to the Main Shaft

Rotate Main Shaft (6) counter-clockwise while driving a selected Punch (3) to the Platen Level. To check that the Punch is at the Platen Level, insert a feeler gauge between the Punch Die (1) that is the same dimensions as the Slot. When the Punch reaches the Platen Level, the feeler gauge will bind.

When Punch (3) is at the Platen Level, note the reading of the Timing Dial referenced to the center of the Pulse Generator Pole. Remove the feeler gauge and continue to rotate Main Shaft (6) until the Selected Punch has reached its maximum throw and has returned to the Platen Level. At this point, calculate the difference between this reading and the previous reading. Divide this difference by two and add the result to the first reading. Rotate Main Shaft (6) until the Timing Dial reads this total figure. The Timing Dial must now be loosened and adjusted to read 307°.

CAUTION: Do not rotate Main Shaft (6) during this final Stage of Timing Dial Calibration.



PUNCH - ADJUSTMENTS AND TIMING- Continued

Punch Pawl Limit Adjustments (Old Style Units)

Loosen Screws (12) and move Punch Pawl Limit (9) so it limits the movement of the actuated Pawls (8) .002 before bottoming against Driver Arms (6).

Punch Drive Adjustment

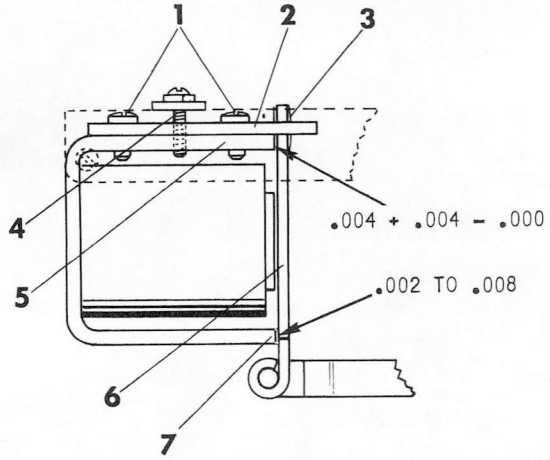
Remove the Lucite Punch Cover and install Gauges 1B9-1031 (.203 length) in the number 1 and 8 Holes in Die Assembly (1). Select the number 1 and 8 Punches and rotate Main Shaft (7) until the high point of Shaft (7) is fully rearward (307° on the Timing Dial). The previously inserted Pins must raise .080 ± .010 above the surface of Plate (2).

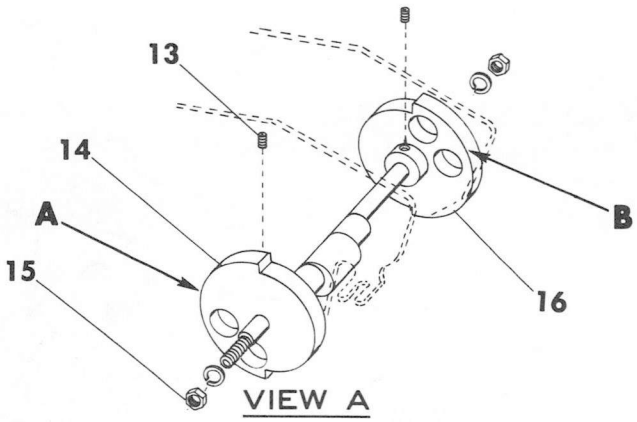
When adjustment is required, loosen Lock Nuts (11) on both sides of the Unit and turn Pawl Carrier Eccentric Shaft (10) to increase or decrease the amount of movement imparted to the Punches.

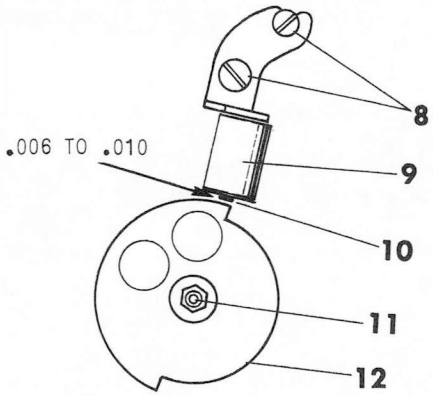
Positive Retraction Adjustments

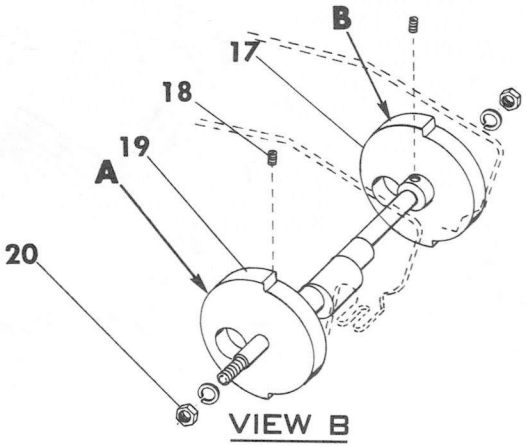
Rotate Shaft (7) until Punch Stripper Rod (4) is fully forward (127° on the Timing Dial). Punch Driver Arms (6) must now have .005 clearance between Driver Arm (6) and Stripper Rod (4). To adjust Stripper Rod (4), loosen Lock Nuts (5) and turn Stripper Rod (4) to obtain the desired .005 clearance.

Turn Main Shaft (7) to 80°. There should be a slight amount of play between Punch Driver Arms (6) and Stripper Rod (4), but Driver Arms (6) when held against Stripper Rod (4) must not allow the Punches to raise above Plate (3) of Assembly (1). Loosen Lock Nuts (5) and readjust Stripper Rod (4) if necessary. Tighten Nuts (5).









PUNCH - ADJUSTMENTS AND TIMING - Continued

Punch Magnet Adjustments

Loosen Binding Screws (1) and move Plate (2) so there is .004 + .004 - .000 clearance between Armature (6) and Shell (5) as indicated, with Bowed Spring (3) in the position shown.

Set the Timing Dial at 127°. There must be .002 to .008 air gap between Armature (6) and Point (7) of Shell (5). When required, loosen Screw (4) and move the Magnet forward or rearward to obtain the aforementioned clearance.

Pulse Generator Adjustments

Rotate Main Shaft (11) until Pulse Generator Disc (12) is at the point where the gap between the Pulse Generator Center Pole (10) and the Pulse Generator Disc is increased as shown.

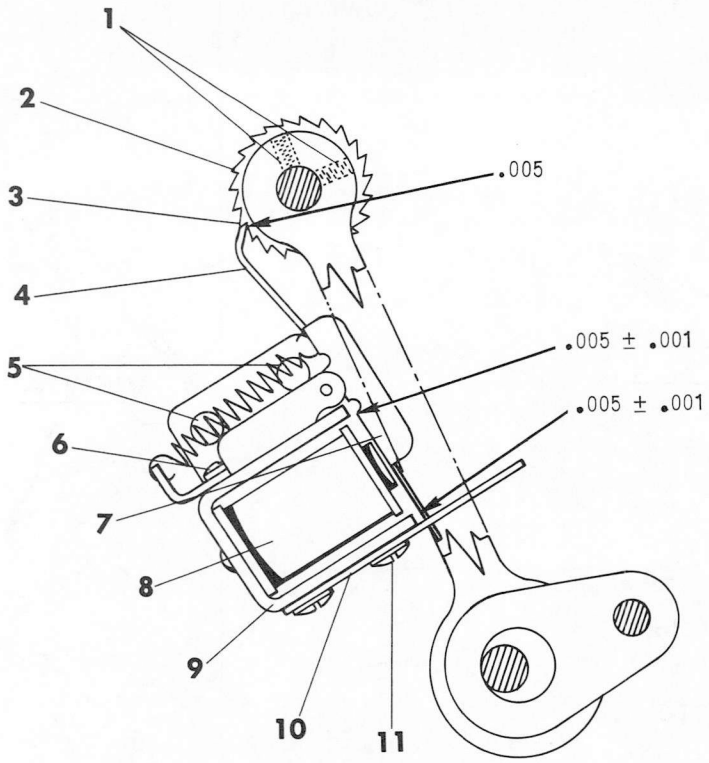
Loosen Screws (8) and move Pulse Generator (9) to within .006 to .010 of Generator Disc (12) as indicated.

PUNCH COUNTER WEIGHT ADJUSTMENT APPLICABLE TO UNITS BELOW SERIAL NUMBER 500-1978 (View A)

Loosen Nut (15) and Set Screw (13). Rotate Counter Weight (14) so the larger radius A is opposite the larger radius B of Timing Generator Disc (16). Tighten Nut (15) and Screw (13).

PUNCH COUNTER WEIGHT ADJUSTMENT APPLICABLE TO UNITS WITH SERIAL NUMBER 500-1978 AND ABOVE (View B)

Loosen Nut (20) and Set Screw (18). Rotate Counter Weight (19) so the larger radius A is in alignment with the larger radius B of Timing Generator Disc (17). Tighten Nut (20) and Screw (18).



PUNCH - ADJUSTMENTS AND TIMING - Continued

Forward and Reverse Index Magnet Armature Adjustments

Armature Assembly (7), when operated, must have .005 ± .001 gap between Magnet Shell (9) and Armature (7). Adjustment may be made by loosening Binding Screws (6) and (11) and repositioning either Armature Assembly (7) or Plate (10).

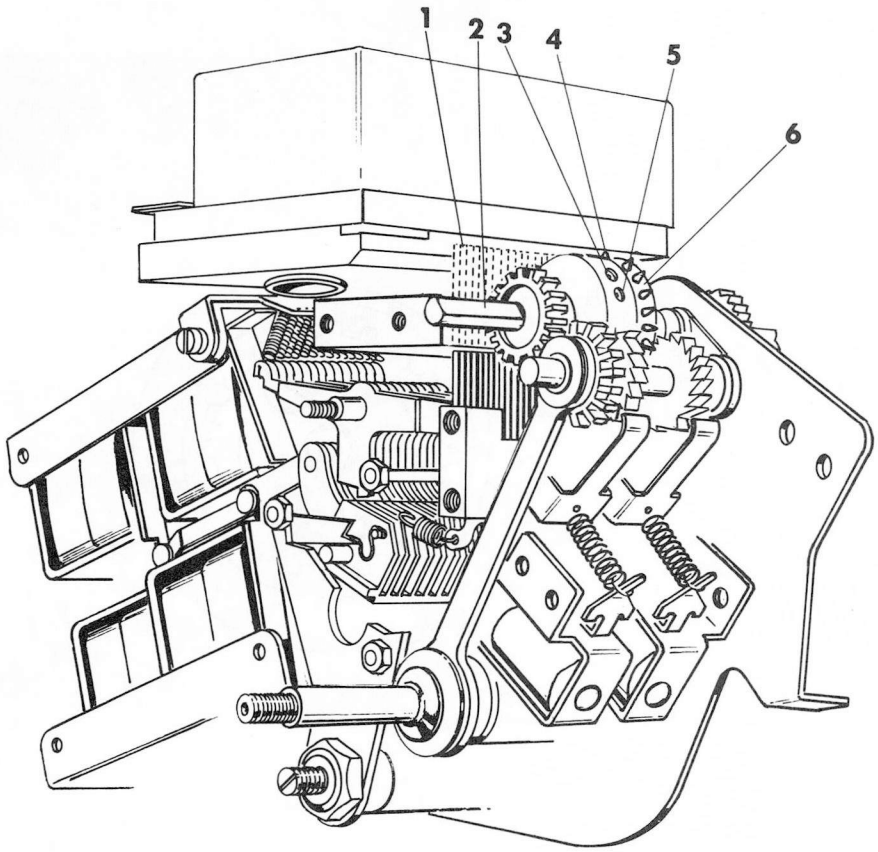
Prior to performing the adjustments to the Indexing Ratchets, the Detent Wheel must be secure on the Sprocket Shaft and the Detent Balls must be located in the Teeth of the Detent Wheel.

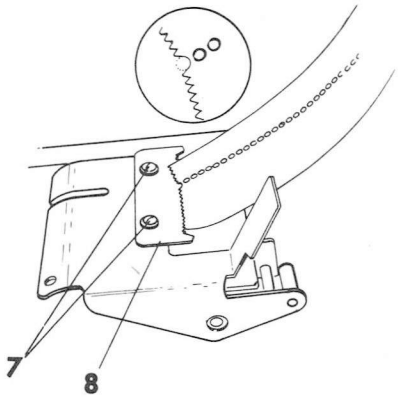
Index Magnet (8), when called, must bring Interposer (4) to within .005 of the bottom of Forward or Reverse Feed Ratchets (2). To adjust the Index Magnets, loosen Binding Screws (5) and move Magnet and Interposer Assembly to obtain the above clearance.

Rotate the Timing Dial to 205° and operate Forward Interposer (4). Interposer (4) must contact Ratchet (2) with no play between the top of Interposer (4) and Ratchet Tooth (3). If adjustment is necessary, loosen Set Screws (1) and reposition Ratchet (2). Check this adjustment on all Teeth of the Ratchet.

On late style Units, the Forward Index Magnet Rear Mounting Screw Hole has been enlarged to permit the Forward Index Magnet adjustment to be made in the following manner: Loosen Screws (5) and pull Magnet (8) to the rear of the Unit so the Rear Screw rests on the edge of the enlarged hole. Rotate Magnet (8) forward until Interposer (4) meets the .005 clearance as previously described. Tighten Screws (5).

NOTE: The Rearward Feed is identical to the Forward Feed; however, the Timing Dial is set at 25° when making the adjustment.





PUNCH - ADJUSTMENTS AND TIMING - Continued

Sprocket Wheel Adjustments

Before adjustments can be made to Sprocket Wheel (6), it is essential to tighten all Screws on Sprocket Shaft (2).

The uppermost Pin (4) of Sprocket Wheel (6) must be positioned .500 away from the center of Punches (1) and in alignment with the Index Punch. To adjust Sprocket (6), loosen Set Screw (3) and tighten Set Screw (5) to move Pin (4) closer to Punches (1). Loosen Set Screw (5) and tighten Set Screw (3) to move Pin (4) further away from Punches (1).

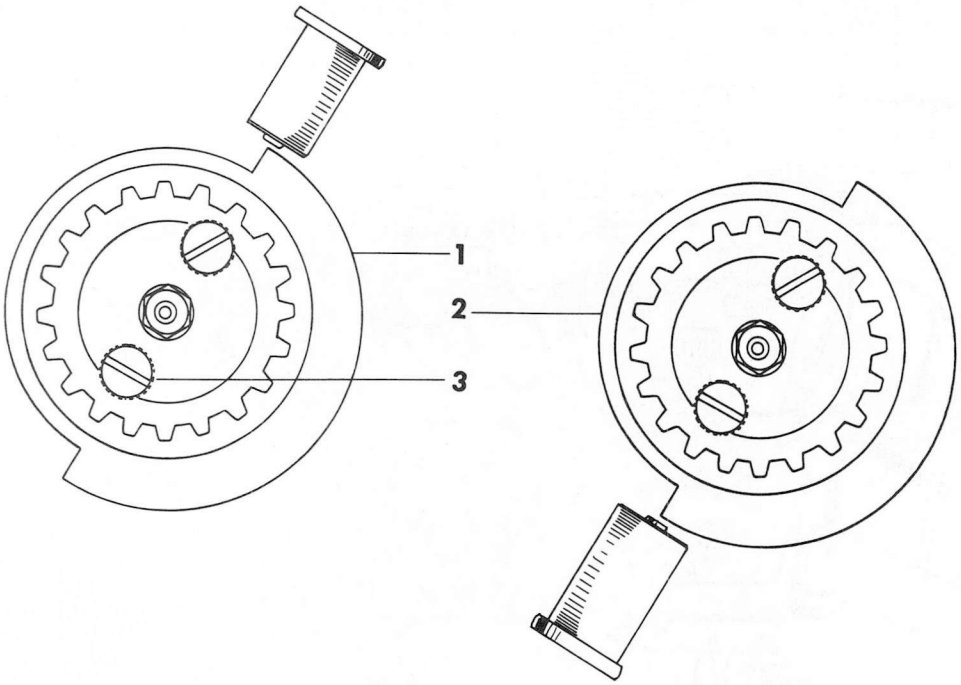
On Units equipped with an Advanced Feed Hole, Pin (4) of Sprocket Wheel (6) must be positioned .513 away from the center of Punches (1).

Final Sprocket Adjustment

Adjust Set Screws (3) and (5) as previously described so the Tape Registration will conform to the Tape Gauge.

Tape Tear Plate

Tape Tear Plate (8) must be adjusted so the operator can tear the Tape directly through the center of an Index Hole, as illustrated. To adjust, loosen Binding Screws (7) and move Tear Plate (8) to the correct position as described.



READER TO PUNCH TIMING - DUAL UNITS ONLY

When adjustments or part replacements are made that will disturb the timing of either the Punch or Reader mechanism, it is essential to retime the Reader to the Punch so the functions of each will occur at the precise moment as indicated by the Timing Chart. This timing will make regenerative punching possible without misinterpretation.

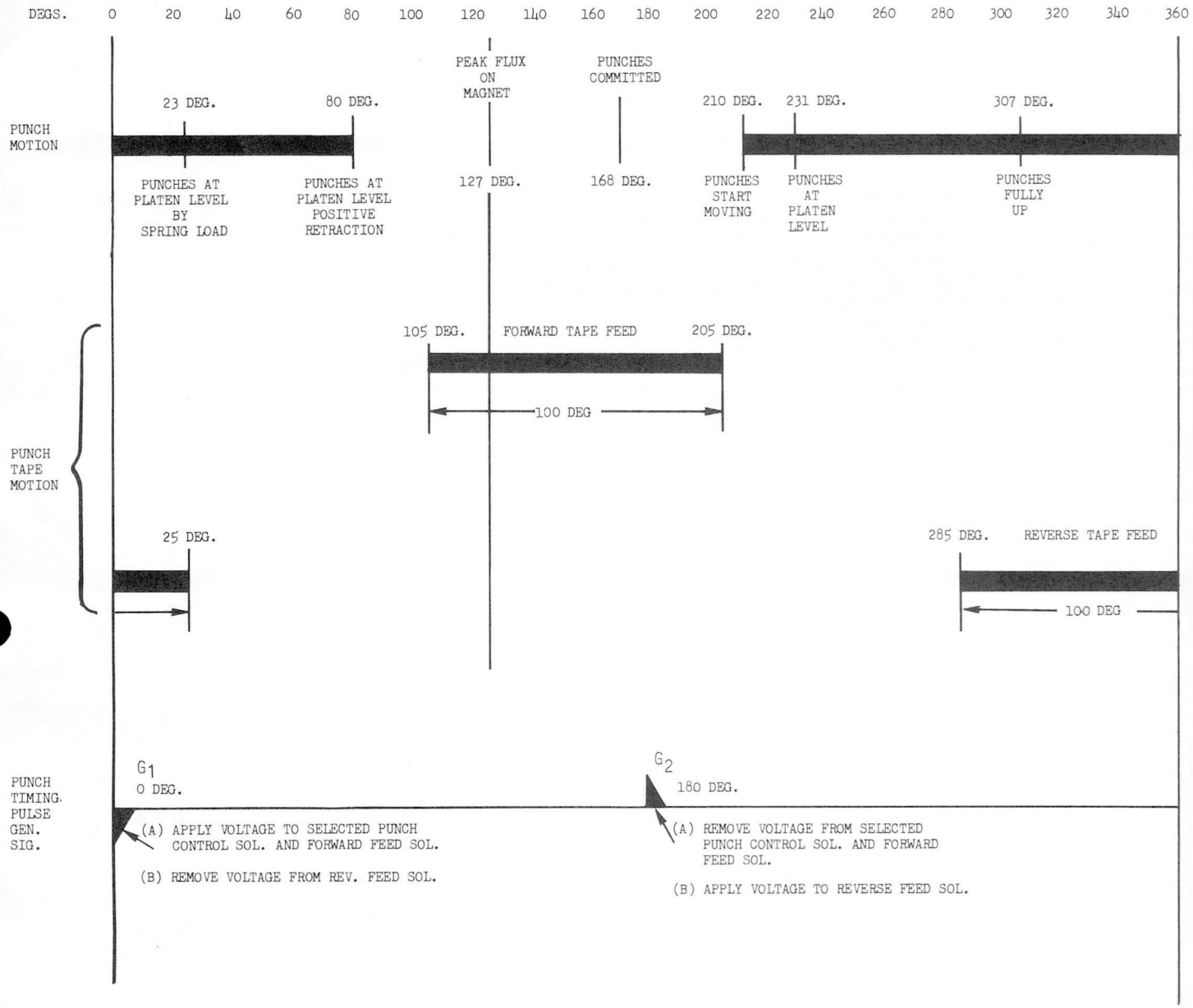
As indicated on the Timing Chart, the Negative Pulse of the Punch Pulse Generator occurs simultaneously with the Negative Pulse of the Reader Pulse Generator.

To time the Reader to the Punch, loosen Pulley Binding Screws (3). Rotate Punch Pulse Generator Disc (2) to coincide with Reader Pulse Generator Disc (1).

While holding Disc (2) in this position, rotate the Reader Pulse Generator Disc (1) to the start of the Reader Positive Pulse, as illustrated. Secure the timing adjustment with Binding Screws (3).

NOTE: A Negative Pulse is produced when the gap between the Pulse Generator Disc and the Electromagnet is suddenly increased.

PUNCH MECHANICAL TIMING CHART


DEGS. 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360
PEAK FLUX ON MAGNET
PUNCHES COMMITTED
PUNCH MOTION
23 DEG.
80 DEG.
210 DEG.
231 DEG.
307 DEG.
PUNCHES AT PLATEN LEVEL BY SPRING LOAD
PUNCHES AT PLATEN LEVEL POSITIVE RETRACTION
127 DEG.
168 DEG.
PUNCHES START MOVING
PUNCHES AT PLATEN LEVEL
PUNCHES FULLY UP
105 DEG.
FORWARD TAPE FEED
205 DEG.
100 DEG
PUNCH TAPE MOTION
25 DEG.
285 DEG.
REVERSE TAPE FEED
100 DEG
PUNCH TIMING PULSE GEN. SIG.
G1
0 DEG.
G2
180 DEG.
(A) APPLY VOLTAGE TO SELECTED PUNCH CONTROL SOL. AND FORWARD FEED SOL.
(B) REMOVE VOLTAGE FROM REV. FEED SOL.
(A) REMOVE VOLTAGE FROM SELECTED PUNCH CONTROL SOL. AND FORWARD FEED SOL.
(B) APPLY VOLTAGE TO REVERSE FEED SOL.

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NOTES

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PUNCH PARTS LIST

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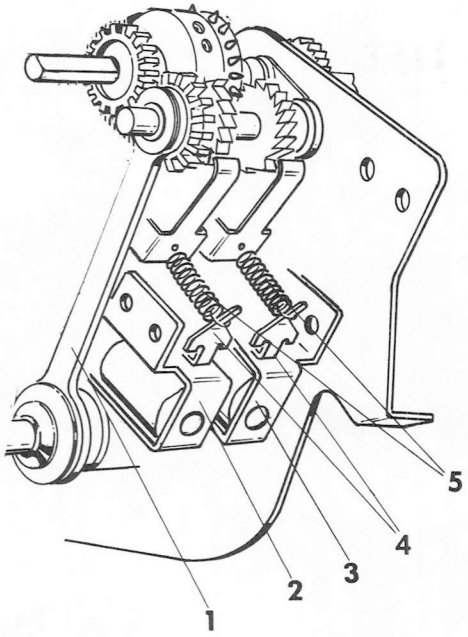
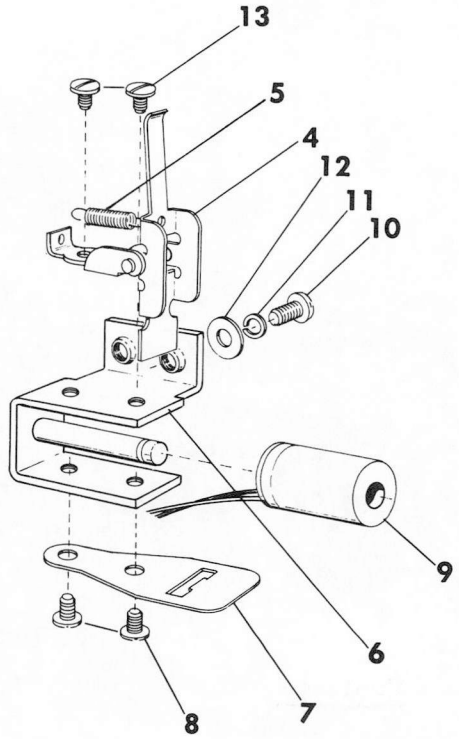
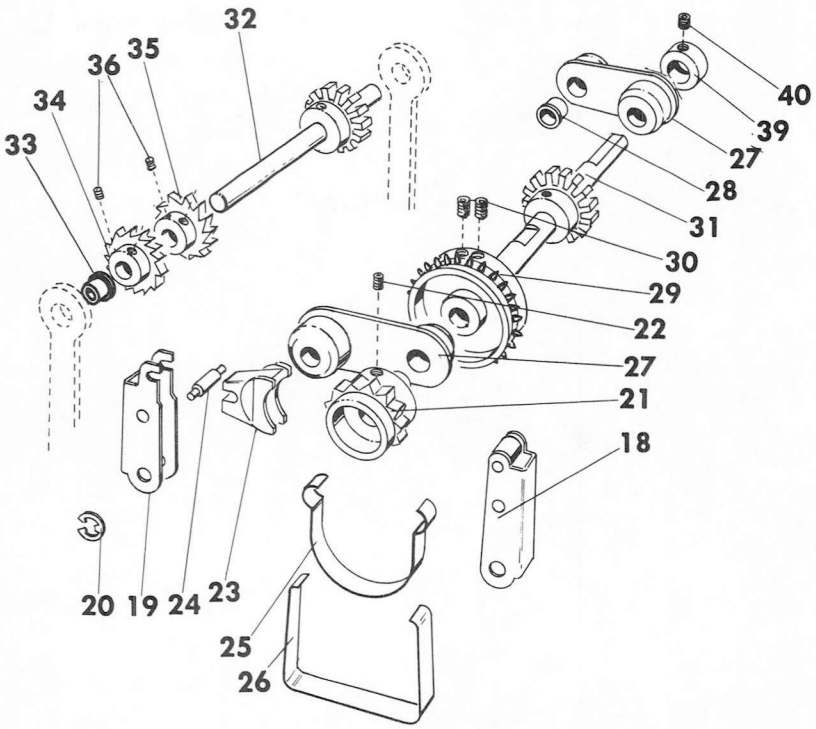
O.E.M. PRODUCTS DIVISION

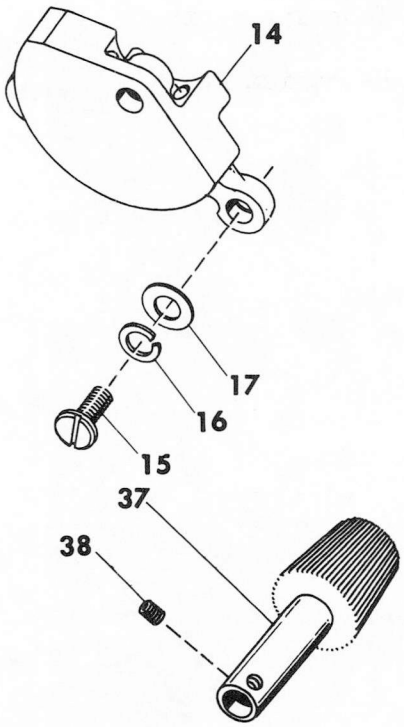
AUTOMATED BUSINESS SYSTEMS, A DIVISION OF LITTON INDUSTRIES
600 WASHINGTON AVENUE, CARLSTADT, N. J. 07072

PUNCH INDEXING PARTS









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PUNCH INDEXING PARTS

Ref. No.	Part No.	Description	Models
(1)	1631-00171	Punch Index Link Assembly	500#
(2)	1631-00271	Forward Index Magnet Complete (24V)	500#
	1682-00120	Forward Index Magnet Complete (48V)	500#
(3)	1631-00321	Reverse Index Magnet Complete (24V)	500#
	1682-00110	Reverse Index Magnet Complete (48V)	500#
(4)	1631-00280	Forward Index Magnet Armature Assembly	500#
	1631-00330	Reverse Index Magnet Armature Assembly	500#
(5)	1A7-1059	Index Magnet Armature Spring	500#
(6)	1631-00310	Forward Magnet Shell Assy	500#
	1631-00360	Reverse Magnet Shell Assy	500#
(7)	1631-10690	Punch Armature Limit	500#
(8)	1A1-1296	Armature Limit Binding Screw (4-48)	500#
(9)	1A8-1564	Index and Pin Retract Coil (45 OHM)(24V)	500#
	1A8-1901	Index and Pin Retract Coil (168 OHM)(48V)	500#
(10)	Z4240	Index Magnet Assembly Binding Screw (6-40)	500#
(11)	P11064	Index Magnet Assembly Binding Screw Lockwasher	500#
(12)	2972-01200	Index Magnet Assembly Binding Screw Washer	500#
(13)	1A1-1296	Interposer Pivot Arm Binding Screw (4-48)	500#
(14)	1631-00370	Ball Detent Housing Complete	500#
(15)	4273	Ball Detent Housing Mounting Screw (6-40)	500#
(16)	P11064	Ball Detent Housing Mounting Screw Lockwasher	500#
(17)	2972-01200	Ball Detent Housing Mounting Screw Washer	500#
(18)*	1631-00072	Detent Arm & Roll Assembly	500#
(19)*	1631-00081	Detent Arm Assembly	500#
(20)*	3300-00780	Detent Arm Retaining Ring	500#
(21)	1631-10101	Detent Wheel	500#
(22)	1A1-1234	Detent Wheel Set Screw (3-56)	500#
(23)*	1631-10080	Detent Friction Shoe	500#
(24)*	1A2-1088	Detent Friction Shoe Pivot	500#
(25)*	1631-10260	Detent Spring	500#
(26)*	1632-10360	Detent Damping Spring	500#
(27)	1631-10550	Ratchet Shaft Pivot Link	500#
(28)	1B1-1025A	Ratchet Shaft Pivot Link Bearing	500#
(29)	1631-10120	Tape Feed Sprocket	500#
(30)	1A1-1303	Tape Feed Sprocket Set Screw (4-40)	500#
(31)	1631-00241	Sprocket Shaft & Gear Assembly (Long)	500#
*	1631-00052	Sprocket Shaft & Gear Assembly (Short)	500#
(32)	1631-00062	Ratchet Shaft & Gear Assembly	500#
(33)	1B1-1025A	Index Link Bearing	500#
(34)	1631-10171	Reverse Tape Feed Ratchet	500#
(35)	1631-10161	Forward Tape Feed Ratchet	500#
(36)	1A1-1234	Forward & Reverse Tape Feed Ratchet Set Screw (3-56)	500#
(37)	1601-00580	Punch Sprocket Knob Assembly	500#
(38)	3071-06300	Punch Sprocket Knob Set Screw (4-48)	500#
(39)	2951-51500	Sprocket Knob Coupling	500#
(40)	3071-09000	Sprocket Knob Coupling Set Screw (4-40)	500#

Parts are also used on Corresponding Advance Feed Hole Models
* Parts available for earlier Models

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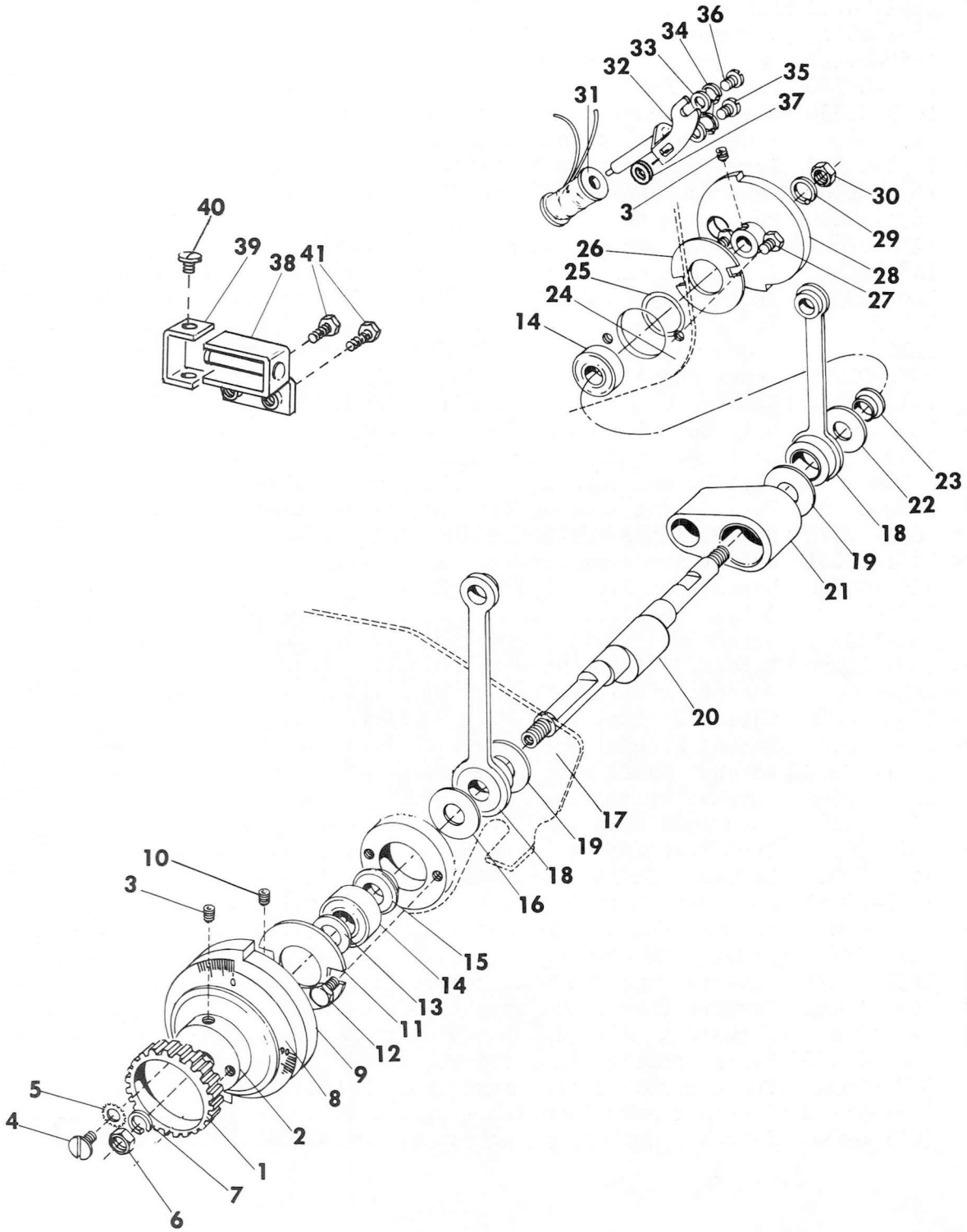
PUNCH MECHANISM PARTS



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PUNCH MECHANISM PARTS

Ref. No.	Part No.	Description	Models
(1)	1631-10180	Input Shaft Pulley (18 Teeth)	500#
(2)	1631-10210	Input Shaft Pulley Hub	500#
(3)	1A1-1031	Input Shaft Pulley Hub Set Screw (6-40)	500#
(4)	Z4262	Input Shaft Pulley Screw (6-40)	500#
(5)	1A6-1106	Input Shaft Pulley Screw Lockwasher	500#
(6)	Z4453	Punch Input Shaft Binding Nut (8-36)	500#
(7)	1A6-1041	Punch Input Shaft Binding Nut Lockwasher	500#
(8)	1B9-1026B	Punch Timing Dial Label	500#
(9)**	1601-11120	Punch Counterweight Generator Disc (Right)	500#
(10)	3071-06300	Counterweight Generator Disc Set Screw (4-48)	500#
*	1A1-1031	Counterweight, Gen. Disc and Hub Set Screw (6-40)	500#
(11)	1A6-1278A	Input Shaft Bearing Retaining Washer	500#
(12)	4504	Input Shaft Bearing Binding Screw (4-48)	500#
(13)	1A6-1135	Punch Counterweight Generator Disc Washer	500#
(14)	1B1-1024	Input Shaft Bearing (Right & Left)	500#
(15)	1A6-1260A	Input Shaft Spacer (Right)	500#
(16)	1A6-1267B	Input Shaft Washer (Outer Right)	500#
(17)*	1601-00223	Punch Side Plate Right w/Bearings	500#
	1601-00516	Punch Side Plate Right w/Bearings (Ball Detent)	500#
(18)	1631-00171	Index Link Assembly	500#
(19)	1A6-1272A	Input Shaft Washer (Inner)	500#
(20)	1601-10405	Punch Input Shaft	500#
(21)	1601-00366	Punch Drive Link Assembly	500#
(22)	1A6-1292	Input Shaft Spacer (Left Inner)	500#
(23)	1A6-1291	Input Shaft Spacer (Left)	500#
(24)*	1601-00232	Punch Side Plate Left w/Bearings	500#
	1601-00495	Punch Side Plate Left w/Bearings (Ball Detent)	500#
(25)	1A6-1274A	Input Shaft Bearing Seal Left	500#
(26)	1A6-1263	Input Shaft Bearing Seal Left Retaining Washer	500#
(27)	4504	Input Shaft Bearing Seal Retaining Screw (4-48)	500#
(28)**	1601-10515	Punch Counterweight Generator Disc (Left)	500#
(29)	1A6-1041	Input Shaft Binding Nut Lockwasher	500#
(30)	Z4453	Input Shaft Binding Nut (8-36)	500#
(31)	1A8-1615	Pulse Generator Magnet & Choke Coil	500#
(32)	1611-00240	Pulse Generator Magnet Bracket Assembly	500#
(33)	2972-01200	Pulse Generator Magnet Bracket Screw Washer	500#
(34)	P11064	Pulse Generator Magnet Brkt. Screw Lockwasher	500#
(35)	3071-12500	Pulse Generator Magnet Brkt. Screw (6-40)(Front)	500#
(36)	4273	Pulse Generator Brkt. Screw (6-40)(Rear)	500#
(37)	2193	Pulse Generator Brkt. Spacer (Optional)	500#
(38)	1631-00101	Magnet Shell Assembly (Right)	500#
(39)	1631-10531	Pulse Generator Choke Bracket	500#
(40)	1A1-1296	Pulse Generator Choke Bracket Screw (4-48)	500#
(41)	4132	Pulse Generator Magnet Shell Screw (4-40)	500#

** NOTE: If necessary to replace a Generator Disc on Units prior to Serial No. 500-1978, both Generator Discs must be replaced with the new Generator Discs (1601-10515) and/or (1601-11120).

Parts are also used on Corresponding Advance Feed Hole Models
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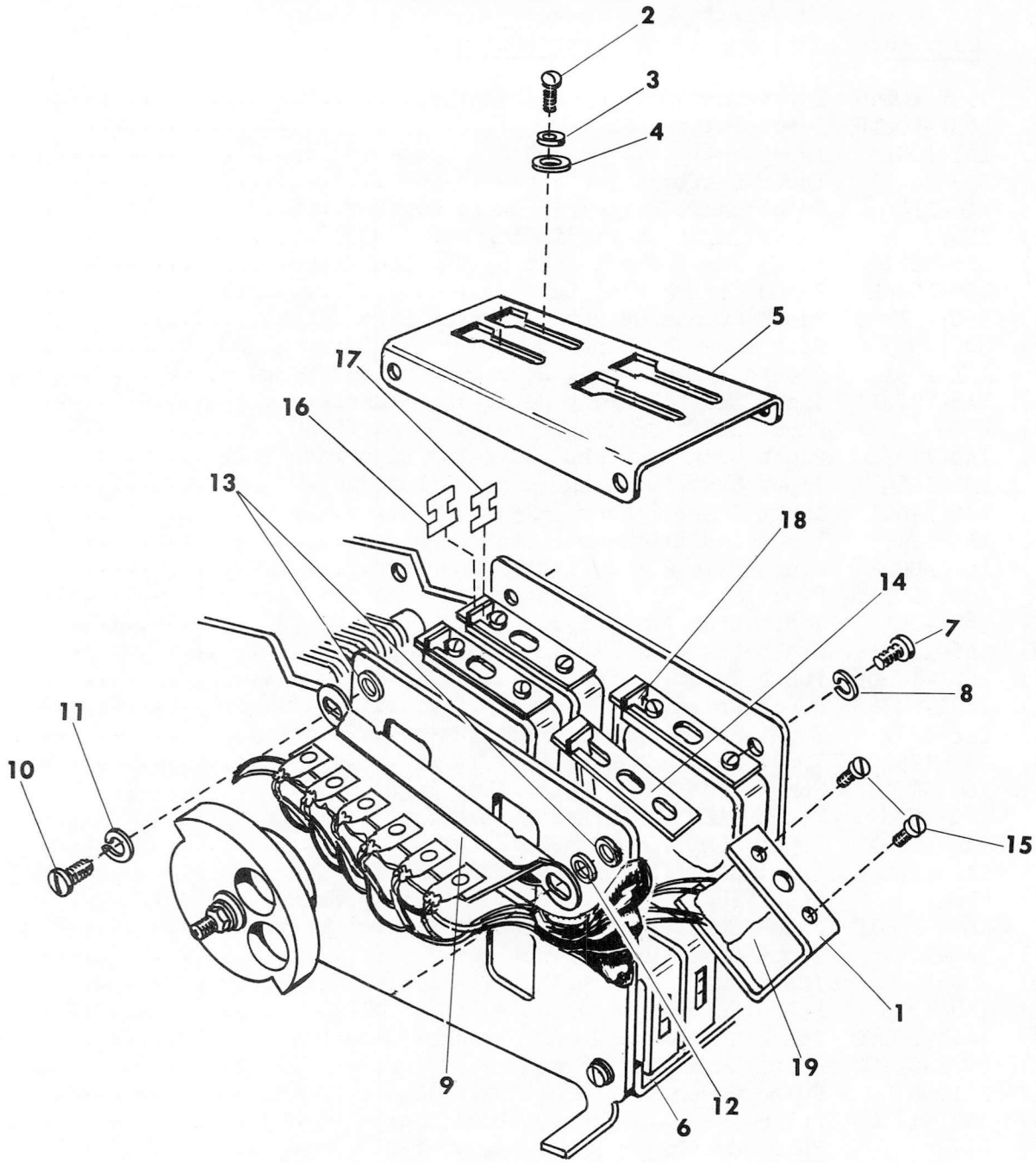
PUNCH MECHANISM PARTS (Continued)



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PUNCH MECHANISM PARTS (Continued)

Ref. No.	Part No.	Description	Models
(1)	1601-00053	Punch Magnet Upper Assembled w/Short Link (24V).....	500#
	1601-00063	Punch Magnet Lower Assembled w/Short Link (24V).....	500#
	1601-00073	Punch Magnet Upper Assembled w/Long Link (24V).....	500#
	1601-00083	Punch Magnet Lower Assembled w/Long Link (24V).....	500#
	1682-00011	Punch Magnet Upper Assembled w/Short Link (48V).....	500#
	1682-00021	Punch Magnet Lower Assembled w/Short Link (48V).....	500#
	1682-00031	Punch Magnet Upper Assembled w/Long Link (48V).....	500#
	1682-00041	Punch Magnet Lower Assembled w/Long Link (48V).....	500#
(2)	4273	Punch Magnet Binding Screw (6-40).....	500#
(3)	P11064	Punch Magnet Binding Screw Lockwasher.....	500#
(4)	2193	Punch Magnet Binding Screw Washer.....	500#
(5)	1601-10260	Punch Magnet Bracket (Upper).....	500#
(6)	1601-10270	Punch Magnet Bracket (Lower).....	500#
(7)	Z4129	Punch Magnet Bracket Binding Screw (6-40).....	500#
(8)	P11064	Punch Magnet Bracket Binding Screw Lockwasher.....	500#
(9)	1A8-1569A	Punch Magnet Terminal Strip.....	500#
(10)	Z4240	Punch Terminal Strip Screw (6-40).....	500#
	3071-12500	Punch Terminal Strip Screw (6-40).....	500#
(11)	P11064	Punch Terminal Strip Screw Lockwasher.....	500#
(12)	1A6-1334	Terminal Strip Spacer (Optional).....	500#
(13)	1A6-1335	Terminal Strip and Spring Bracket Spacer..... (not used with Out-of-Tape Switch)	500#
(14)	1601-10080	Punch Magnet Armature Retainer.....	500#
(15)	1A1-1002	Punch Magnet Armature Retainer Screw (3-56).....	500#
(16)	1601-10130	Punch Magnet Armature Spacer.....	500#
(17)	1601-10330	Punch Magnet Armature Spring.....	500#
(18)	1601-00093	Punch Magnet Link Assy. w/Armature Short Upper.....	500#
	1601-00103	Punch Magnet Link Assy. w/Armature Short Lower.....	500#
	1601-00113	Punch Magnet Link Assy. w/Armature Long Upper.....	500#
	1601-00123	Punch Magnet Link Assy. w/Armature Long Lower.....	500#
(19)	1A8-1435A	Punch Magnet Coil (24V).....	500#
	1A8-1903	Punch Magnet Coil (48V).....	500#

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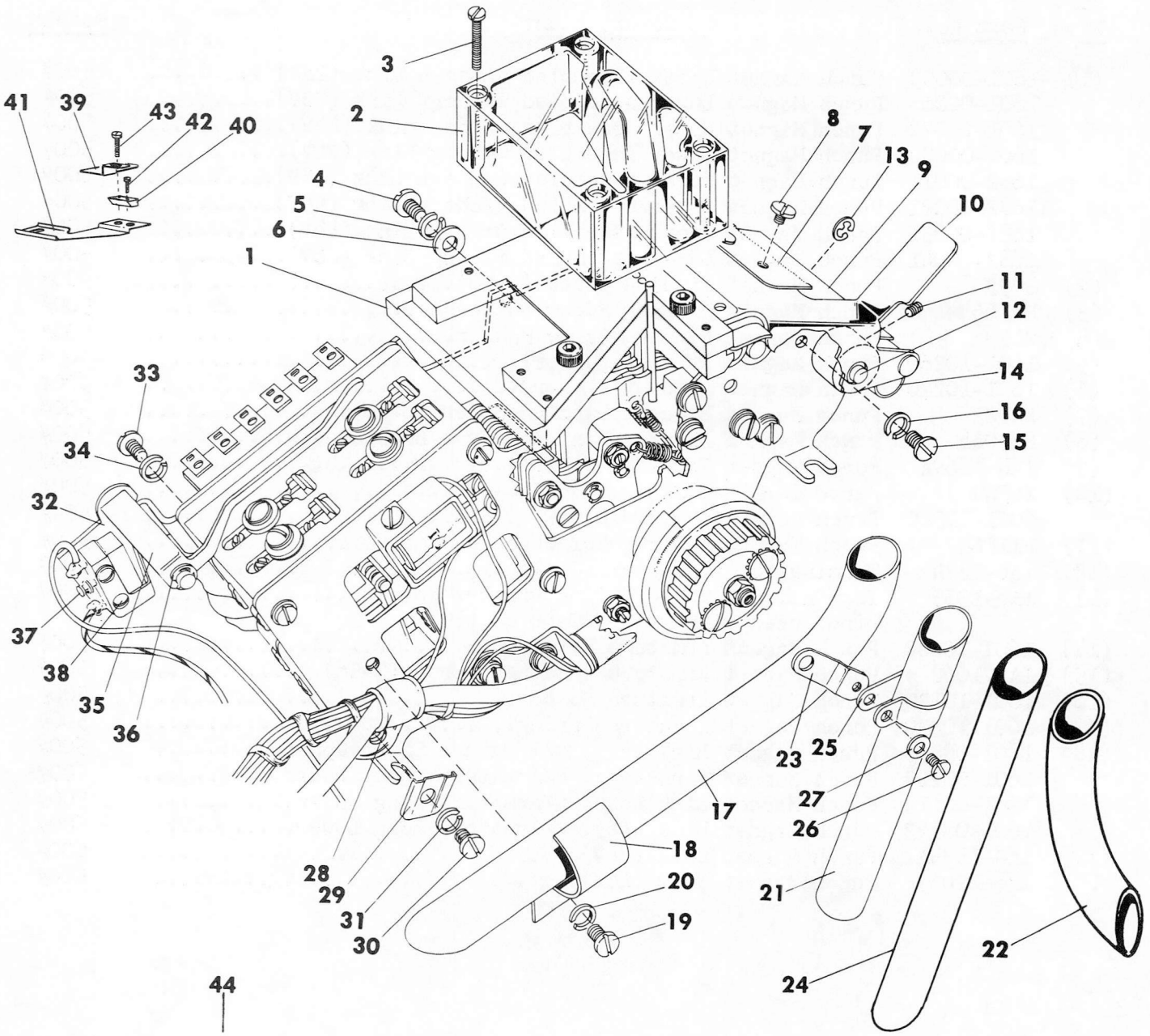
PUNCH MECHANISM PARTS (Continued)



Punch Out-of-Tape Switch Complete

Ref. No.	Part No.	Description	Models
(1)	1601-00035	Punch and Die Guide Assembled.....	500
	1661-00015	Punch and Die Guide Assembled (Advanced Feed Hole).....	501
(2)	1601-10251	Punch Cover.....	500#
(3)	1A1-1270	Punch Cover Binding Screw (3-56).....	500#
(4)	Z4240	Punch and Die Guide Assembled Mounting Screw (6-40).....	500#
(5)	P11064	Punch and Die Guide Assembled Mounting Screw Lockwasher..	500#

Continued ....

PUNCH MECHANISM PARTS (Continued)

Ref. No.	Part No.	Description	Models
(6)	2972-01200	Punch and Die Guide Assembled Mounting Screw Washer.....	500#
(7)	1601-10620	Punch Tape Cutter.....	500#
(8)	Z4168	Punch Tape Cutter Mounting Screw (3-56).....	500#
(9)*	1601-00183	Punch Platen Assembly.....	500#
	1601-00610	Punch Platen Assembly (Wide).....	500#
(10)	1601-00043	Punch Tape Deflector Assy.....	500#
(11)	1A1-1031	Punch Tape Deflector Set Screw (6-40).....	500#
(12)	1631-10420	Tape Deflector Pivot Rod.....	500#
(13)	Z2740	Tape Deflector Rod Retaining Ring.....	500#
(14)	1631-10110	Tape Deflector Spring.....	500#
(15)	Z4240	Punch Platen Assembly Mounting Screw (6-40).....	500#
(16)	P11064	Punch Platen Assembly Mounting Screw Lockwasher.....	500#
(17)	1601-10530	Chad Tube (Optional).....	500#
(18)	1601-10520	Chad Tube Clamp (Optional).....	500#
(19)	9E4098	Chad Tube Clamp Binding Screw (6-40)(Optional).....	500#
(20)	P11064	Chad Tube Clamp Binding Screw Lockwasher (Optional).....	500#
(21)	1601-10830	Chad Tube (Optional)(Rear Disposal).....	500#
(22)	1601-11160	Chad Tube (Side Disposal)(Optional)(Desk).....	500#
(23)	1601-10860	Chad Tube Bracket Rear (Use w/Ref. 17 & 21).....	500#
	1662-10010	Chad Tube Bracket Rear (Use w/Ref. 22).....	500#
	1675-10210	Chad Tube Bracket Rear (Use w/Ref. 24).....	500#
(24)	1675-10500	Chad Tube (Rack Mounted Unit).....	500#
(25)	1A8-1641	Chad Tube Cable Clip (Use w/Ref. 22).....	500#
(26)	Z4240	Chad Tube Cable Clip Binding Screw (6-40).....	500#
(27)	2972-01200	Chad Tube Cable Clip Binding Screw Washer.....	500#
(28)	1A8-1237	Cable Clamp (3/8-6).....	500#
(29)	1A8-1381	Cable Clamp "D" Washer.....	500#
(30)	3071-12500	Cable Clamp Binding Screw (6-40).....	500#
(31)	P11064	Cable Clamp Binding Screw Lockwasher.....	500#
(32)	1601-00470	Out-of-Tape Switch Bracket Assembled (Optional).....	500#
(33)	3071-12500	Out-of-Tape Switch Bracket Binding Screw (6-40).....	500#
(34)	P11064	Out-of-Tape Switch Bracket Binding Screw Lockwasher.....	500#
(35)	1601-10770	Out-of-Tape Switch Blade (Optional).....	500#
(36)	Z2740	Out-of-Tape Switch Blade Retaining Ring.....	500#
(37)	1A8-1566	Micro Switch (Optional).....	500#
(38)	1A8-1555	Micro Switch Actuator w/Screws & Nuts (Optional).....	500#
(39)	1601-10651	Punch Tape Chute.....	500
	1661-10050	Punch Tape Chute.....	501
(40)*	1601-10661	Punch Tape Chute Spacer.....	500#
*	1601-10800	Punch Tape Chute Spacer (Out-of-Tape)(Optional).....	500#
(41)	1601-10790	Out-of-Tape Switch Hold Down (Optional).....	500#
	1675-10550	Out-of-Tape Switch Hold Down (Optional)(Small).....	500#
(42)	4295	Punch Tape Chute Spacer Binding Screw (3-56).....	500#
		Out-of-Tape Switch Hold Down Screw (Optional).....	500#
(43)	1A1-1051	Punch Tape Chute Binding Screw (Long).....	500#
	Y4071	Punch Tape Chute Binding Screw (Short).....	500#
(44)		Punch Out-of-Tape Switch Complete (To order, specify complete part name) w/Ref. (32-35-36-37-38).....	500#

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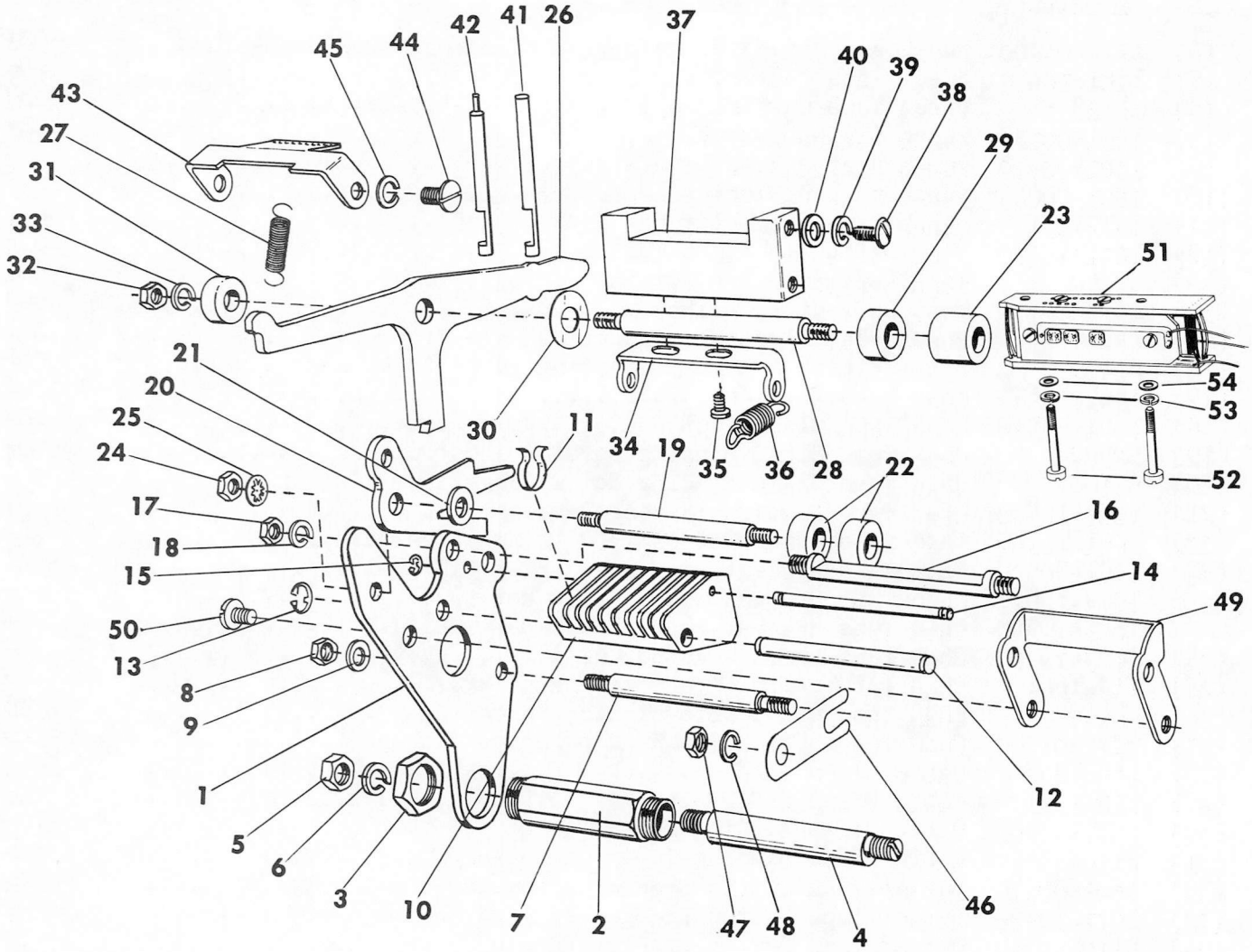
PUNCH MECHANISM PARTS (Continued)



Ref. No.	Part No.	Description	Models
(1)	1601-11090	Punch Pawl Yoke Side Plate	500#
*	1601-10463	Punch Pawl Yoke Side Plate	500#
(2)	1601-10092	Punch Pawl Yoke Bushing	500#
(3)	1A5-1009A	Punch Pawl Yoke Bushing Nut (3/8-24)	500#
(4)	1601-10240	Punch Pawl Yoke Eccentric	500#
(5)	Z4453	Punch Pawl Yoke Eccentric Binding Nut (8-36)	500#
(6)	1A6-1041	Punch Pawl Yoke Eccentric Binding Nut Lockwasher	500#
(7)	1601-10475	Punch Drive Link Pin	500#
(8)	1A5-1027	Punch Drive Link Pin Binding Nut (4-40)	500#
(9)	1812	Punch Drive Link Pin Binding Nut Lockwasher	500#
(10)	1601-10320	Punch Pawl Guide	500#
(11)	1601-10354	Punch Pawl Spring	500#
(12)	1601-10410	Pawl Rest	500#

Continued ....

PUNCH MECHANISM PARTS (Continued)

Ref. No.	Part No.	Description	Models
(13)	3075-00200	Pawl Rest Retaining Ring	500#
(14)	1601-10391	Punch Pawl Over-Centering Spring Rod	500#
(15)	1A6-1246	Punch Pawl Over-Centering Spring Rod Retaining Ring	500#
(16)	1601-10682	Punch Stripper	500#
(17)	1A5-1027	Punch Stripper Retaining Nut (4-40)	500#
(18)	1812	Punch Stripper Retaining Nut Lockwasher	500#
(19)	1601-10480	Punch Pawl Pivot	500#
(20)	1601-10105	Punch Pawl	500#
*	1601-10102	Punch Pawl	500#
(21)	1601-10490	Punch Pawl Spacer	500#
(22)	1A6-1242	Punch Pawl Spacer (Advanced Feed Hole)	501
(23)	1A6-1300B	Punch Pawl Spacer Right (Advanced Feed Hole)	501
(24)	1A5-1027	Punch Pawl Pivot Nut (4-40)	500#
(25)	1812	Punch Pawl Pivot Nut Lockwasher	500#
(26)	1601-10586	Punch Arm (Long)	500
*	1601-10582	Punch Arm (Short)	500
	1661-10015	Punch Arm (Advanced Feed Hole) (Long)	501
*	1661-10011	Punch Arm (Advanced Feed Hole) (Short)	501
(27)	1A7-1044	Punch Arm Spring (Parity)	500#
	1A7-1045	Punch Arm Spring (All Arms w/o Parity)	500#
*	1A7-1038	Punch Arm Spring	500#
(28)	1601-10440	Punch Arm Pivot	500#
(29)	1A6-1242	Punch Arm Spacer (Right)	500#
(30)	1601-10435	Punch Arm Spacer (Center)	500#
(31)	1A6-1243B	Punch Arm Spacer (Left)	500#
(32)	1A5-1027	Punch Arm Pivot Binding Nut (4-40)	500#
(33)	1812	Punch Arm Pivot Binding Nut Lockwasher	500#
(34)	1601-10695	Punch Yoke Spring Anchor	500#
*	1601-10693	Punch Yoke and Punch Arm Spring Anchor	500#
(35)	3300-06440	Spring Anchor Binding Screw (3-56)	500#
(36)	1A7-1042A	Punch Pawl Yoke Spring	500#
(37)	1601-10232	Punch Arm Stop	500#
(38)	Z4240	Punch Arm Stop Mounting Screw (6-40)	500#
(39)	P11064	Punch Arm Stop Mounting Screw Lockwasher	500#
(40)	2972-01200	Punch Arm Stop Mounting Screw Washer	500#
(41)	1601-10571	Punch	500#
(42)	1601-10562	Index Punch	500#
(43)	1601-10971	Punch Arm Spring Anchor Bracket	500#
(44)	3071-12500	Punch Arm Spring Bracket Screw (6-40)	500#
(45)	P11064	Punch Arm Spring Bracket Screw Lockwasher	500#
(46)	1601-11150	Yoke Assembly Shim (.003 Optional)	500#
(47)	9E4451	Yoke Assembly Shim Nut (6-40)	500#
(48)	P11064	Yoke Assembly Shim Lockwasher	500#
(49)*	1601-10750	Punch Driver Arm Pawl Limit Stop	500#
(50)*	P4144	Punch Driver Arm Pawl Limit Stop Binding Screw (4-48)	500#
(51)	1601-00545	Error Detector Block Assem. (Parity)	500#
(52)	1A1-1311	Error Detector Block Assem. Mounting Screw (6-40)	500#
(53)	P11064	Error Detector Block Assem. Mounting Screw Lockwasher	500#
(54)	1A6-1338	Error Detector Block Assem. Mounting Screw Washer	500#

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NOTES

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PUNCH ELECTRONICS

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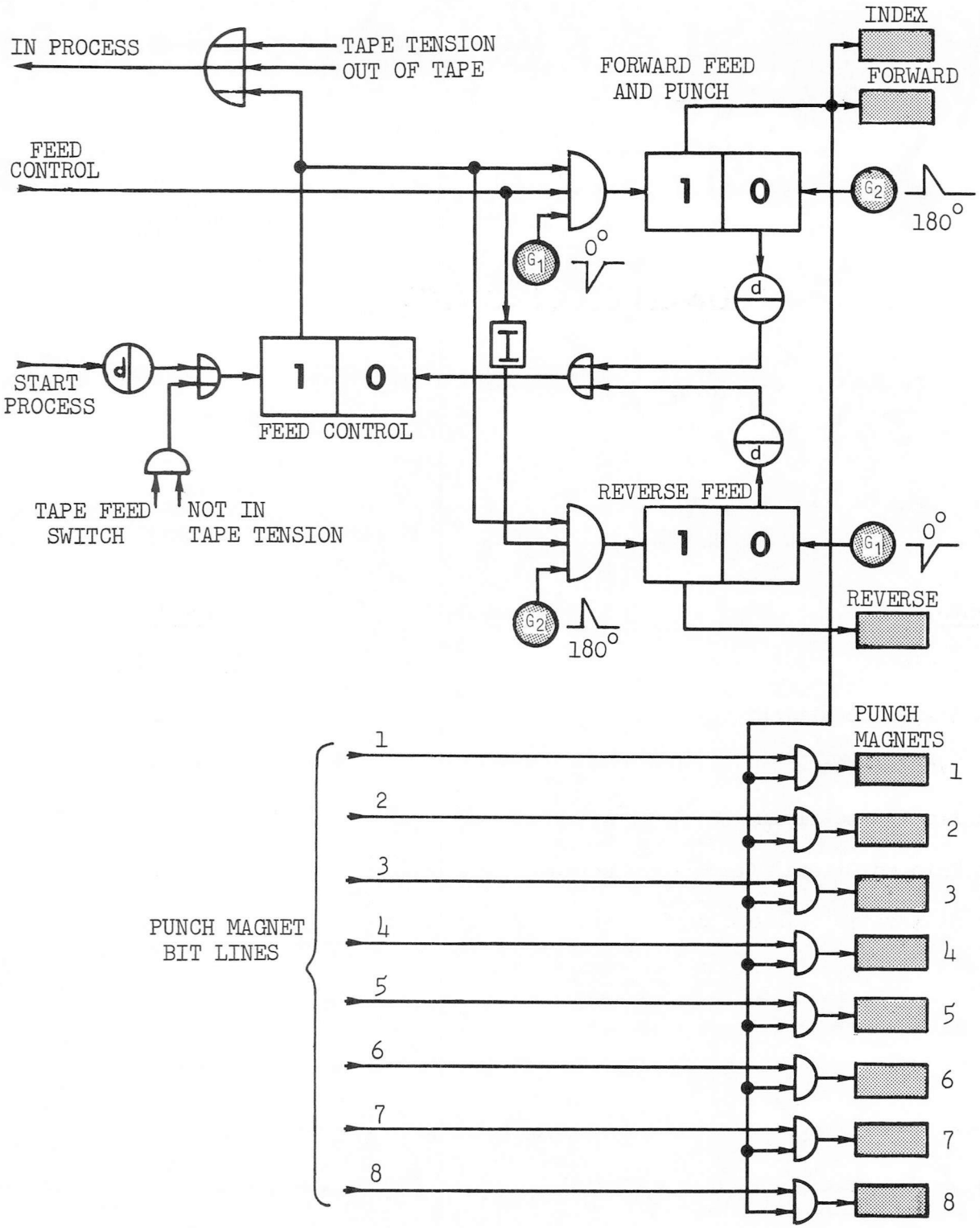
Punch Dynamic State	PE5-5
Punch Electronic Timing	PE5-6
Punch Printed Circuit Card Component Location	PE5-7 and 8
Punch Sechematic (at end of Section)	

O.E.M. PRODUCTS DIVISION

AUTOMATED BUSINESS SYSTEMS, A DIVISION OF LITTON INDUSTRIES
600 WASHINGTON AVENUE, CARLSTADT, N. J. 07072

PUNCH LOGIC DIAGRAM



PUNCH LOGIC

GENERAL

This unit is a 50 Character per second Punch designed to punch 5,6,7 or 8 Channel Tape. The signal requirements from the controlling source are the Coded Bits, the Feed Direction Control Line and the Start Process Control. Immediately after the controlling signals are received, the unit will emit an In Process Signal for the duration of the necessary portion of the Feed Punch Cycle.

Punch Logic Description

When the Start Process Signal is applied the signal is differentiated and sets the Feed Control Flip-Flop. This Flip-Flop produces an In Process Signal and satisfies the first Leg of two AND Gates that control the setting and resetting of the Forward and Reverse Feed Flip-Flops. The second Leg of the AND Gates is controlled by the Feed Direction Control Line. When this line is held at Ground it satisfies the Leg of the AND Gate controlling the Forward Feed Flip-Flop and since this signal is inverted it does not satisfy the Leg of the AND Gate controlling the Reverse Feed Flip-Flop. When the Feed Direction Control Line is Negative, it does not satisfy the Leg of the AND Gate controlling the Forward Feed Flip-Flop, but since the Negative Signal inverted is Ground, it satisfies the Leg of the AND Gate controlling the Reverse Feed Flip-Flop. The Feed Direction Control Line must be conditioned before the Start Process Signal is applied to insure the desired direction of Tape Feeding. The third Leg of each of the AND Gates is controlled by the Pulse Generator on the Main Shaft. G1 is the Pulse at 0 degrees and controls the Leg of the AND Gate for the Forward Feed Flip-Flop. G2 is the Pulse at 180° and controls the Leg of the AND Gate for the Reverse Flip-Flop.

The Logic Flow is as follows:

Codes may only be punched when the Tape is Feeding in the forward direction. With the Feed Direction Control Line conditioned for Forward Feed, the differentiated Start Process Signal sets the Feed Control Flip-Flop.

The Feed Control Flip-Flop also produces the In Process Signal. At the same time the Start Process Signal is applied, the signals to the selected Bit Lines must also be applied and held for the duration of the In Process Signal. The Feed Control Flip-Flop plus the Feed Direction Control Line satisfy two of the Legs of the AND Gate controlling the Forward Feed Flip-Flop. When the G1 (0°) Pulse satisfies the third Leg of this AND Gate the Forward Feed Flip-Flop is set and power is applied to the Forward Feed and Index Punch Magnets. Also one leg of the eight AND Gates controlling the Punch Magnets is satisfied. The other leg of the AND Gates is conditioned by the selected Input Bit Lines.

The Forward Feed Flip-Flop is reset by the G2 (180°) Pulse, and removes the power from the Punch and Feed Magnets. The resetting of the Forward Feed Flip-Flop is differentiated and resets the Feed Control Flip-Flop to remove the In Process Signal.

For operation at 50 CPS the next Start Process Signal and selected Code Signals must be applied within 10 Milliseconds or before the next G1 (0°) Pulse.

Tape Feed, Tape Tension and Out-Of-Tape Operation

The Tape Feed Switch applies a set Signal to the input of the Feed Control Flip-Flop provided the Tape Tension Switch has not transferred. This causes Tape to feed Forward and Punch Index Holes or feed in reverse depending on the condition of the Feed Direction Control Line. Feeding will continue until the Switch is released.

Tape Tension and Out-Of-Tape Switches produce the In Process Signal when in their transferred state.

PUNCH STATIC CONDITIONS (With Power On, Tape Loaded and No Tape Tension)

Switches
Tape Tension Switch - 4 and 5 closed.
Tape Feed Switch - 4 and 5 open.
Punch Out-of-Tape Switch - 3 and 4 closed. (Models 524 and 525)

Flip-Flops
Reverse TR13 On clamped to the reset state (Ground on Collector TR13)
Forward TR15 On clamped to the reset state (Ground on Collector TR15)
Feed Control TR18 On (reset state)

Emitter Follower
TR11 Continuously conducting Positive and Negative Pulses.

Amplifiers
TR1 thru 8 Off Not Conducting
TR9 Not Conducting
TR10 Not Conducting

Magnets
L1 thru 11 De-energized

Feed Direction Control
If -6 Volts is present at the junction of CR27 and CR31 it will clamp the Forward Flip-Flop in its reset state. If the clamp from the Feed Control Flip-Flop is released, and the next Positive Signal is generated from the Pulse Generator, the Reverse Flip-Flop will be set.

If Ground is present at the junction of CR27 and CR31, the Reverse Flip-Flop will be clamped in its reset state and when the next Negative Signal is received from the Pulse Generator, the Forward Flip-Flop will be set, provided the clamp from the Feed Control Flip-Flop is removed.

Start Process
The "Start Process Signal" (when grounded) will set the Feed Control Flip-Flop and will initiate a Feed-Punch Cycle.

In-Process
A Ground Signal is fed out of the unit to the outside source by either depressing the "Tape Feed Switch", transferring the Tape Tension Switch or when the Feed Control Flip-Flop is in its set state. The signal informs the outside source that the Punch is performing an operation, or the Tape is under excessive tension.

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PUNCH DYNAMIC STATE

With the Tape Tension Switch closed (Tape not under tension) and the Tape Feed Switch closed (manually), Ground will be at the Collector of TR17. The Feed Control Flip-Flop will be set, removing the Ground clamp from the Forward and Reverse Flip-Flop by way of CR24 and CR25 and the Collector of TR18. With the Ground clamps removed, the Feed Direction Control Signal designates Forward or Reverse direction. A Ground at the junction of CR27-CR31 will keep the Reverse Flip-Flop clamped in its reset state.

By having a Ground signal at this point instead of -6 Volts, the Forward Flip-Flop is allowed to be set when the next Negative Signal is received at the Base of TR14, from the Pulse Generator. With the Forward Flip-Flop in its set state, the Ground that was present at the Collector of TR15, when it was in its reset state, is now removed.

A current path is formed from -18VD through R41, R24, Base-Emitter of TR9 also R26, Base-Emitter of TR10. With TR9 and TR10 conducting, an Index Hole will be punched in the Tape and it will be fed forward one position. Also, TR10 supplies a Ground from its Collector to the Emitters of TR1 thru 8.

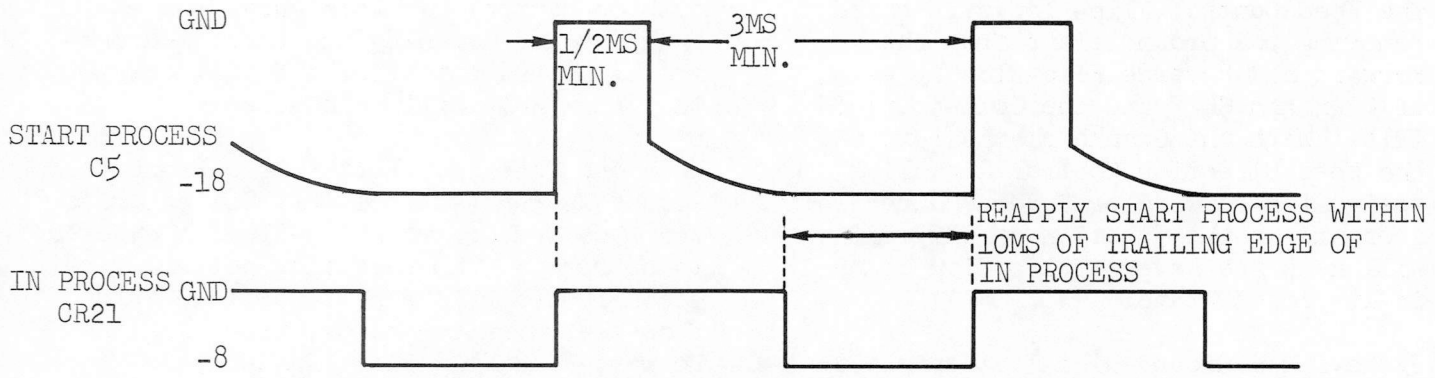
This allows any or all of TR1-TR8 to conduct depending upon which of the transistors received an Input code (-6 Volts) on their Bases from the outside source. In this case, (Tape Feed) we are assuming the Input sources are at Ground potential and that only the Index Hole will be punched.

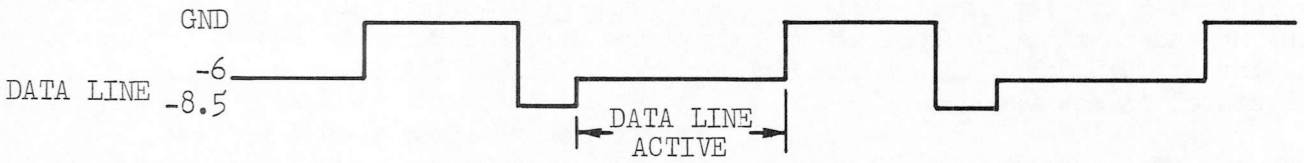
When the Tape Feed Button is released, Ground is removed from TR17 Collector and the Feed Control Flip-Flop is allowed to be reset. The resetting action is accomplished by the next positive Pulse from the Pulse Generator, resetting the Forward Feed Flip-Flop and applying Ground from the Collector of TR15 through C3 and CR28 to the Base of TR17 cutting it off, resetting the Feed Control Flip-Flop and removing the Ground from the In-Process Line indicating to the outside source that the Punch is ready to receive a Start Process Signal.

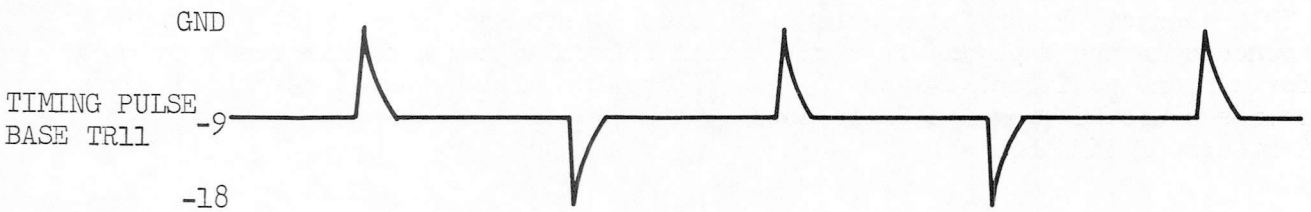
In operations other than Tape Feed, the Start Process Signal (GND) sets the Feed Control Flip-Flop. At this time an In Process signal is generated to the outside source indicating that the Punch is in operation and a normal Feed and Punch operation will occur as described above.

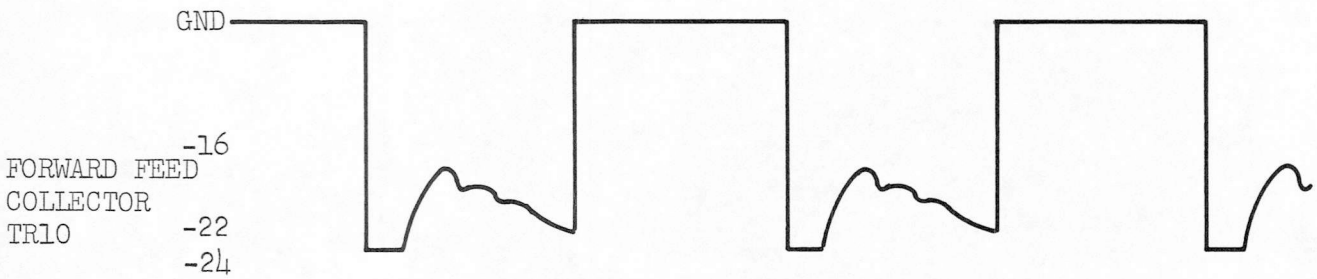
PUNCH ELECTRONIC TIMING (50 CPS OPERATION)

All Wave Forms shown in
reference to Start Process









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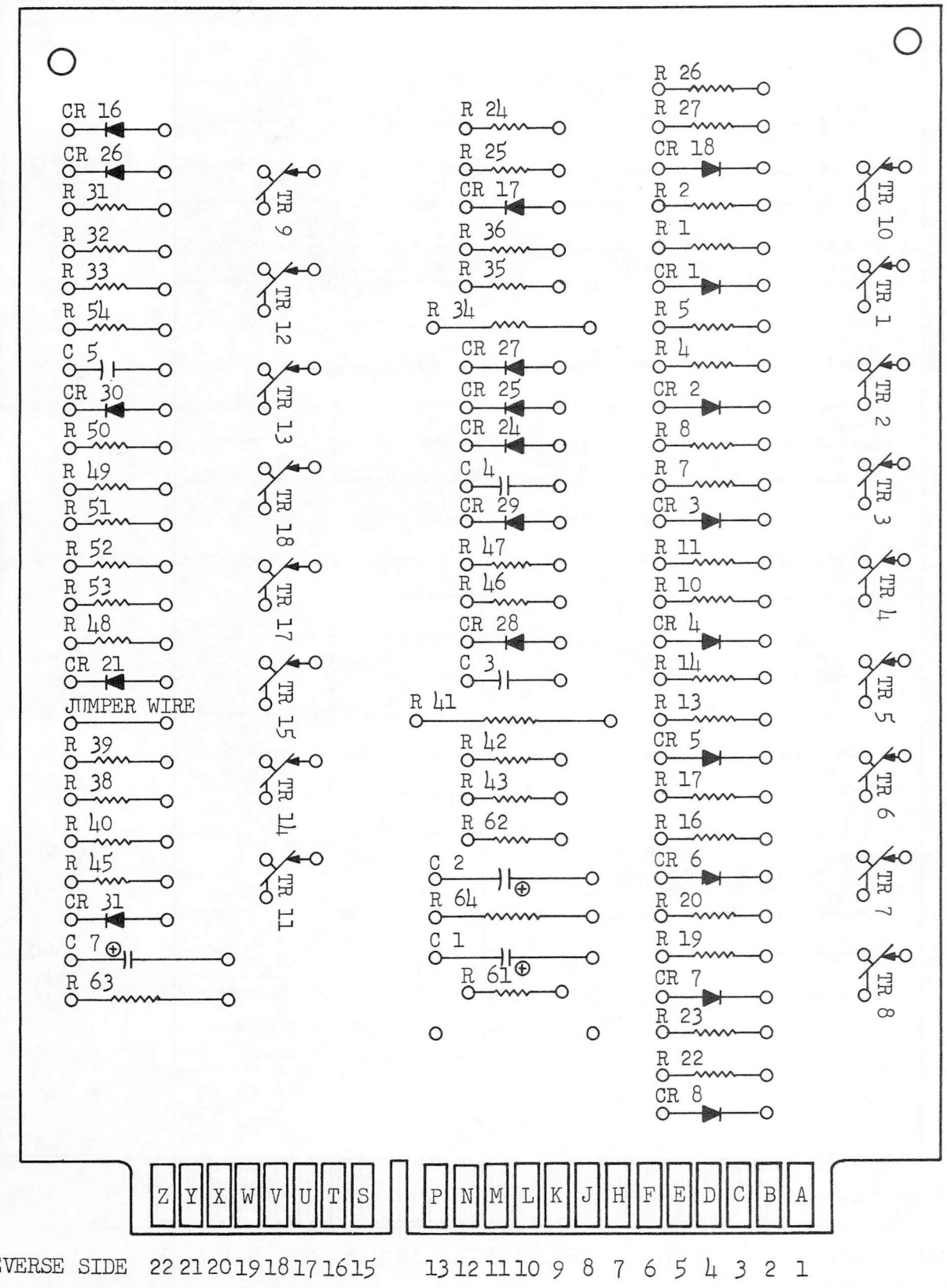
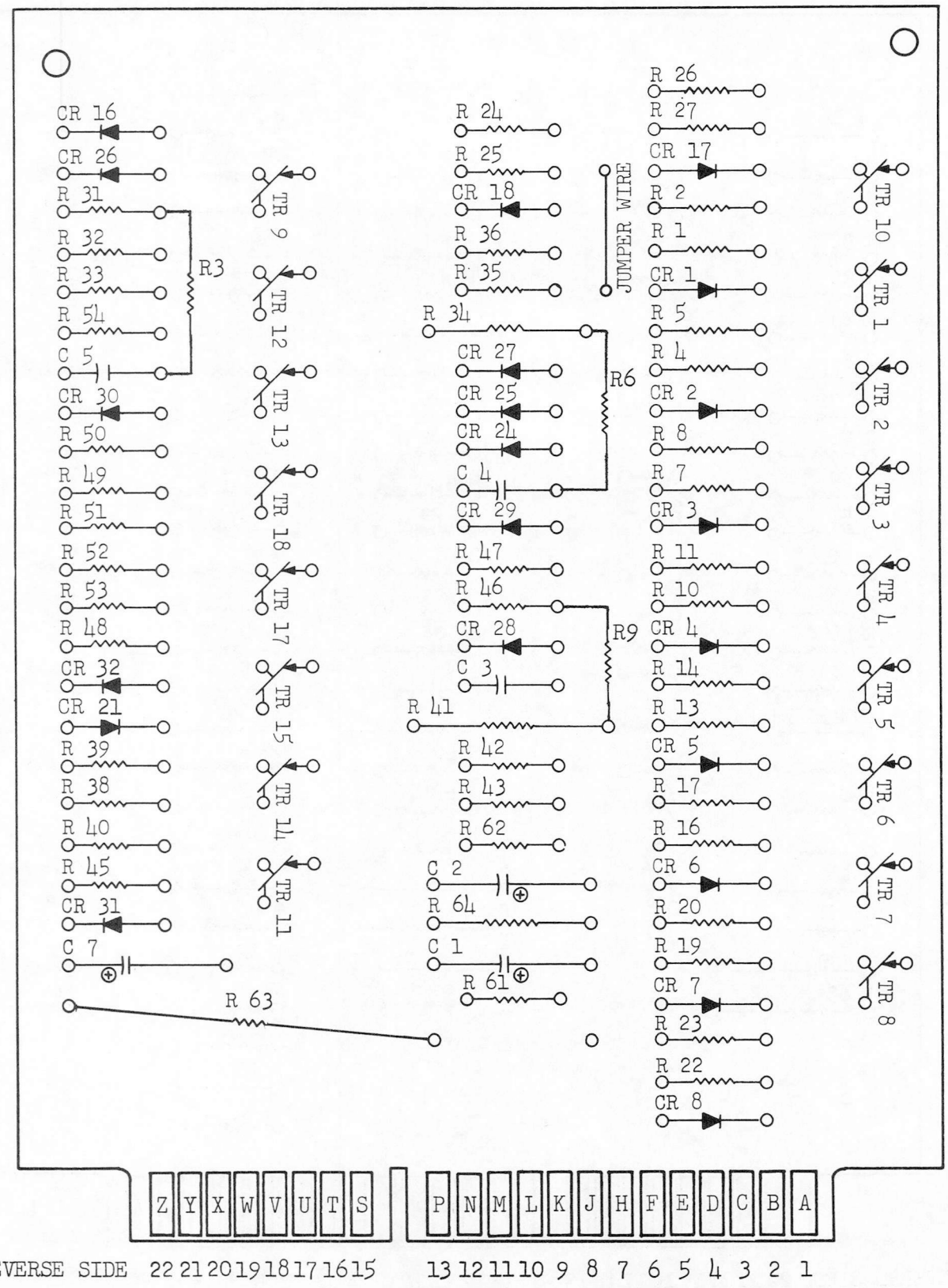
PUNCH CARD COMPONENT LOCATION (for Circuit Cards without Red Numeral 1 Identification)



PUNCH CARD COMPONENT LOCATION (for Circuit Cards with Red Numeral 1 Identification)



PUNCH ELECTRONIC PARTS LIST

Contents

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PUNCH ELECTRONIC PARTS LIST (Printed Circuit Card with Red Numeral 1 Identification	PEP5-2
PUNCH ELECTRONIC PARTS LIST (Printed Circuit Card without Red Numeral 1 Identification	PEP5-3

O.E.M. PRODUCTS DIVISION
AUTOMATED BUSINESS SYSTEMS, A DIVISION OF LITTON INDUSTRIES
600 WASHINGTON AVENUE, CARLSTADT, N. J. 07072

PUNCH ELECTRONIC PARTS LIST

Punch Printed Circuit Card Assembly - Part No. 1632-00053
(With Red Numeral 1 Identification)

Resistor	Part No.	Value	Resistor	Part No.	Value
R1	1A8-1476	820 OHMS	R33	1A8-1343	4.7 K
R2	1A8-1344	3.3 K	R34	1A8-1287	330 OHMS 2W
R3	1A8-1036	56 K	R35	1A8-1536	180 OHMS
R4	1A8-1476	820 OHMS	R36	1A8-1295	1 K
R5	1A8-1344	3.3 K	R38	1A8-1295	1 K
R6	1A8-1036	56 K	R39	1A8-1295	1 K
R7	1A8-1476	820 OHMS	R40	1A8-1344	3.3 K
R8	1A8-1344	3.3 K	R41	1A8-1596	180 OHMS 3W*
R9	1A8-1036	56 K	R42	1A8-1295	1 K
R10	1A8-1476	820 OHMS	R43	1A8-1343	4.7 K
R11	1A8-1344	3.3 K	R45	1A8-1475	1.2 K
R13	1A8-1476	820 OHMS	R46	1A8-1363	8.2 K
R14	1A8-1344	3.3 K	R47	1A8-1363	8.2 K
R16	1A8-1476	820 OHMS	R48	1A8-1295	1 K
R17	1A8-1344	3.3 K	R49	1A8-1295	1 K
R19	1A8-1476	820 OHMS	R50	1A8-1344	3.3 K
R20	1A8-1344	3.3 K	R51	1A8-1295	1 K
R22	1A8-1476	820 OHMS	R52	1A8-1457	1.5 K
R23	1A8-1344	3.3 K	R53	1A8-1344	3.3 K
R24	1A8-1295	1 K	R54	1A8-1363	8.2 K
R25	1A8-1343	4.7 K	R61	1A8-1507	470 OHMS
R26	1A8-1452	82 OHMS	R62	1A8-1286	680 OHMS
R27	1A8-1977	390 OHMS	R63	1A8-1629	68 OHMS 10W*
R31	1A8-1457	1.5 K	R64	1A8-1570	470 OHMS 1W
R32	1A8-1508	1.8 K			

Transistor	Part No.	Type	Transistor	Part No.	Type
TR1 thru 9	1A8-1579	2N1373	TR14	1A8-1577	2N1372
TR10	1A8-1551	2N1038	TR15	1A8-1577	2N1372
TR11	1A8-1551	2N1038	TR17	1A8-1577	2N1372
TR12	1A8-1551	2N1038	TR18	1A8-1577	2N1372
TR13	1A8-1577	2N1372			

Diode	Part No.	Type	Diode	Part No.	Type
CR1 thru 8	1A8-1317	UT111	CR21	1A8-1578	CTP462
CR16 thru 18	1A8-1317	UT111	CR24 thru 32	1A8-1578	CTP462

Capacitor	Part No.	Value	Capacitor	Part No.	Value
C1	1A8-1575	10 uf 50V	C4	1A8-1538	.1 uf 100V
C2	1A8-1575	10 uf 50V	C5	1A8-1513	.33 uf 50V
C3	1A8-1538	.1 uf 100V	C7	1A8-1630	50 uf 25V

* Indicates ± 5% - all other values ± 10%.

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PUNCH ELECTRONIC PARTS LIST

Punch Printed Circuit Card Assembly - Part No. 1632-00052
(Without Red Numeral 1 Identification)

Resistor	Part No.	Value	Resistor	Part No.	Value
R1	1A8-1476	820 OHMS	R34	1A8-1570	470 OHMS 1W
R2	1A8-1344	3.3 K	R35	1A8-1362	270 OHMS
R4	1A8-1476	820 OHMS	R36	1A8-1457	1.5 K
R5	1A8-1344	3.3 K	R38	1A8-1295	1 K
R7	1A8-1476	820 OHMS	R39	1A8-1295	1 K
R8	1A8-1344	3.3 K	R40	1A8-1500	6.8 K
R10	1A8-1476	820 OHMS	R41	1A8-1596	180 OHMS 3W*
R11	1A8-1344	3.3 K	R42	1A8-1295	1 K
R13	1A8-1476	820 OHMS	R43	1A8-1343	4.7 K
R14	1A8-1344	3.3 K	R45	1A8-1475	1.2 K
R16	1A8-1476	820 OHMS	R46	1A8-1344	3.3 K
R17	1A8-1344	3.3 K	R47	1A8-1363	8.2 K
R19	1A8-1476	820 OHMS	R48	1A8-1295	1 K
R20	1A8-1344	3.3 K	R49	1A8-1295	1 K
R22	1A8-1476	820 OHMS	R50	1A8-1500	6.8 K
R23	1A8-1344	3.3 K	R51	1A8-1295	1 K
R24	1A8-1295	1 K	R52	1A8-1457	1.5 K
R25	1A8-1344	3.3 K	R53	1A8-1500	6.8 K
R26	1A8-1452	82 OHMS	R54	1A8-1363	8.2 K
R27	1A8-1286	680 OHMS	R61	1A8-1507	470 OHMS
R31	1A8-1457	1.5 K	R62	1A8-1286	680 OHMS
R32	1A8-1508	1.8 K	R63	1A8-1629	68 OHMS 10W*
R33	1A8-1343	4.7 K	R64	1A8-1570	470 OHMS 1W

Transistor	Part No.	Type	Transistor	Part No.	Type
TR1 thru 9	1A8-1579	2N1373	TR14	1A8-1577	2N1372
TR10	1A8-1551	2N1038	TR15	1A8-1549	2N1478
TR11	1A8-1549	2N1478	TR17	1A8-1577	2N1372
TR12	1A8-1551	2N1038	TR18	1A8-1577	2N1372
TR13	1A8-1577	2N1372			

Diode	Part No.	Type	Diode	Part No.	Type
CR1 thru 8	1A8-1317	UT111	CR21	1A8-1578	CTP462
CR16 thru 18	1A8-1317	UT111	CR24 thru 31	1A8-1578	CTP462

Capacitor	Part No.	Value	Capacitor	Part No.	Value
C1	1A8-1575	10 uf 50V	C4	1A8-1502	.05 uf 100V
C2	1A8-1575	10 uf 50V	C5	1A8-1513	.33 uf 50V
C3	1A8-1502	.05 uf 100V	C7	1A8-1630	50 uf 25V

* Indicates ± 5% - all other values ± 10%.

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NOTES

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PREVENTIVE MAINTENANCE

This Section contains Lubrication and Preventive Maintenance Instructions on the ROYTRON 500 Series Reader/Punch Mechanisms.

O.E.M. PRODUCTS DIVISION
AUTOMATED BUSINESS SYSTEMS, A DIVISION OF LITTON INDUSTRIES
600 WASHINGTON AVENUE, CARLSTADT, N. J. 07072

GENERAL INSTRUCTIONS
500 SERIES PREVENTIVE MAINTENANCE

Initial Preventive Maintenance

After 40 million Punch or Read cycles of operation, or 360 million total cycles including idling, or after four months elapsed time, whichever occurs first.

Second Preventive Maintenance

After 80 million Punch and/or Read cycles of operation, or after 720 million total cycles including idling, or after four months elapsed time from the initial Preventive Maintenance, whichever occurs first.

Preventive Maintenance should consist of the following:

1. All adjustments and timing requirements described in the 500 Series Service Manual should be checked. Perform adjustments and replace worn parts as required.

2. It will be necessary to remove some parts in order to properly effect inspection and lubrication and to examine parts for wear.

3. Parts to be removed for proper inspection are indicated at the beginning of the Section pertaining to the unit under inspection.

4. Any parts removed or replaced during Preventive Maintenance must be lubricated with the specified lubricant and installed in their original location.

5. Use a soft, clean brush to remove dirt, paper dust, chad, and other foreign matter from the unit. A blower may be used but only with caution.

6. Use a lint-free cleaning cloth to remove excessive or dried lubricants.

7. CAUTION - Lubricants must not come in contact with solenoid cores or armature surfaces. Lubricants and accumulated lint, paper dust, etc., cause an adhesive condition which affects proper operation.

8. After completion of the Preventive Maintenance, reassemble and install the unit. Perform a functional test of sufficient duration to insure error free operation.

STEP 1 Preparatory Disassembly (Figure 1)
Remove Unit from Housing and remove the following to gain access to areas of Cleaning, Inspection and Lubrication:

(1) Tape Deflector Plate
(2) Platen
(3) Tape Guide
(4) Idler Pulley Assembly
(5) Tape Guide Support

CAUTION Note the amount and position of Shims held in place by Support Screws.

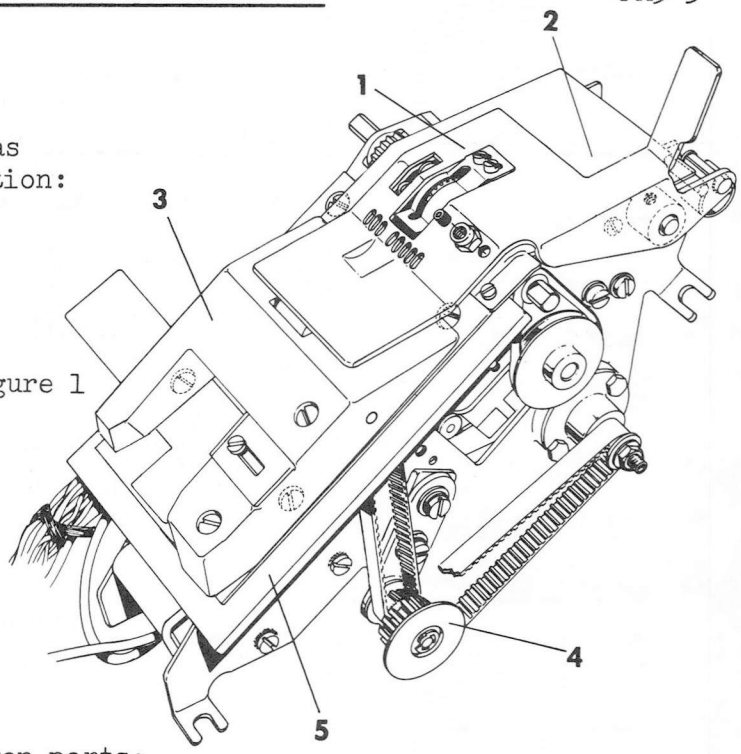

Figure 1

STEP 2 Cleaning
Clean Unit as described under General Instructions (opposite page).

STEP 3 Parts Check (Figure 2)
Check the following for worn or broken parts:

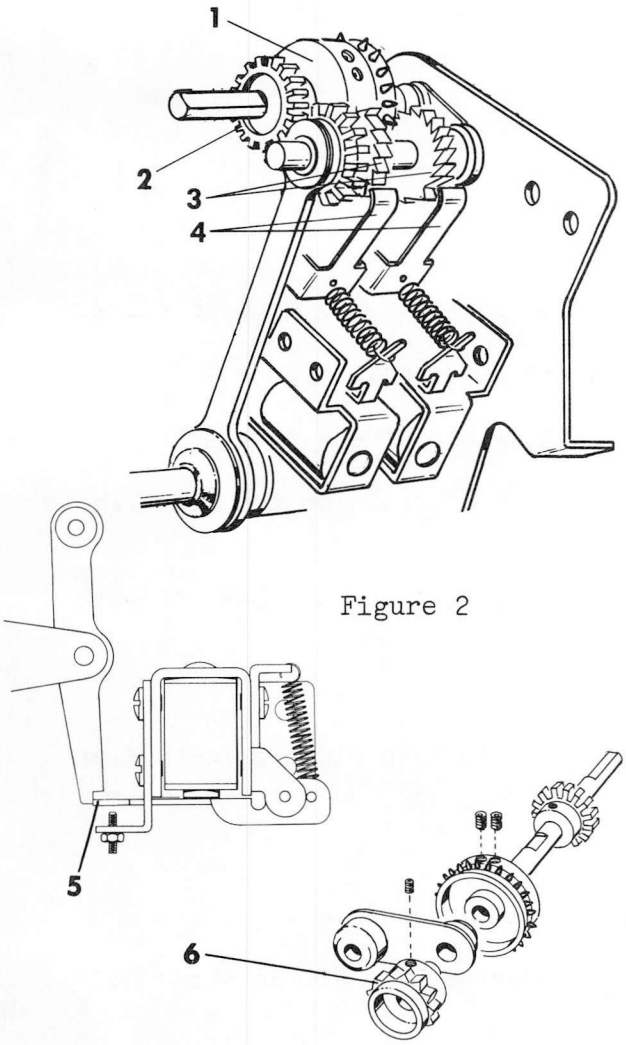

Figure 2

(1) Sprocket Wheel
(2) Index Gears
(3) Index Ratchet Wheels
(4) Index Magnet Interposer Tips
(5) Retract Magnet Interposers and Links
(6) Detent Wheel

In addition to the preceding step, visually check the entire Unit paying particular attention to the following:

1. Main Shaft Bearings
   (excessive play or binding)
2. Contact Block Wire Connections
   (frayed wires, insulation, etc.)
3. Sensing Pins
   (play in Guide or Shaft, worn, etc.)
4. Wiring, Solder Points, Crimp Terminals
   (frayed wiring, insulation, etc.)
5. Input Pulley & Generator Disc
   (loose set screws, proper adjustment)
6. Tape Deflector & Control Spring
   (distorted Deflector, proper clearance, secure holding of Tape against Sprocket)

STEP 4 Lubrication
Lubricate the Unit as described and illustrated on Pages PM5-4 & 5.

STEP 5 Reassembly
Install the previously removed parts carefully noting that the parts are clean and that the Support Shims are in the proper location.

BASIC READER PREVENTIVE MAINTENANCE LUBRICATION

1. Index Link - Custom Lube 700 in Link Hole.
2. Forward and Reverse Tape Feed Ratchets - Gulflex A Grease on all teeth.
3. Ratchet Gear - Gulflex A Grease on all teeth.
4. Ratchet Shaft Pivot Link - Custom Lube 700 inside bearing hole and on link surface.
5. Sprocket Gear - Gulflex A Grease on all teeth.
6. Detent Wheel - Gulflex A Grease on all teeth.
7. Detent Arm and Roll Assembly - Custom Lube 700 on Roll and pivot points.
8. Detent Spring - Custom Lube 700 at two points indicated.
9. Detent Arm Assembly - Custom Lube 700 on four holes shown.
10. Hold Down Plate Shaft - Custom Lube 700.
11. Tape Feed Roll Shaft - Custom Lube 700 (not excessively).
12. Idler Pulley - Custom Lube 700.
13. Pressure Roll - Custom Lube 700 on bearing hole.
14. Tape Feed Roll Link - Custom Lube 700 in all holes.
15. Solenoid Link - Custom Lube 700 in all holes.
16. Pressure Roll Arm - Custom Lube 700 in four holes shown.
17. Tape Feed and Pin Retract Assembly - Custom Lube 700 in six holes on both sides.
18. Reader Bracket Arm Assembly - Custom Lube 700 on two pivot points shown.
19. Detent Assembly-New Style - Gulflex A Grease packed within recess of Housing.
20. Forward and Reverse Index Magnet Interposers - Gulflex A Grease on the tip of both Interposers.
21. Interposer Arm Assembly Left and Right - Custom Lube 700 at points shown on both sides.
22. Reader Bracket Arm Assembly Shaft - Custom Lube 700.
23. Eccentric Shaft Washers and Spacers - Custom Lube 700 on both sides between Arms and Side Plates.
24. Interposer Arm Notch - Gulflex A Grease.
25. Interposer Magnet Armature Pivot - Custom Lube 700 on both ends.
26. Reader Switch Blades (In Position and Auto-Feed) - Custom Lube 700 in shaft holes.

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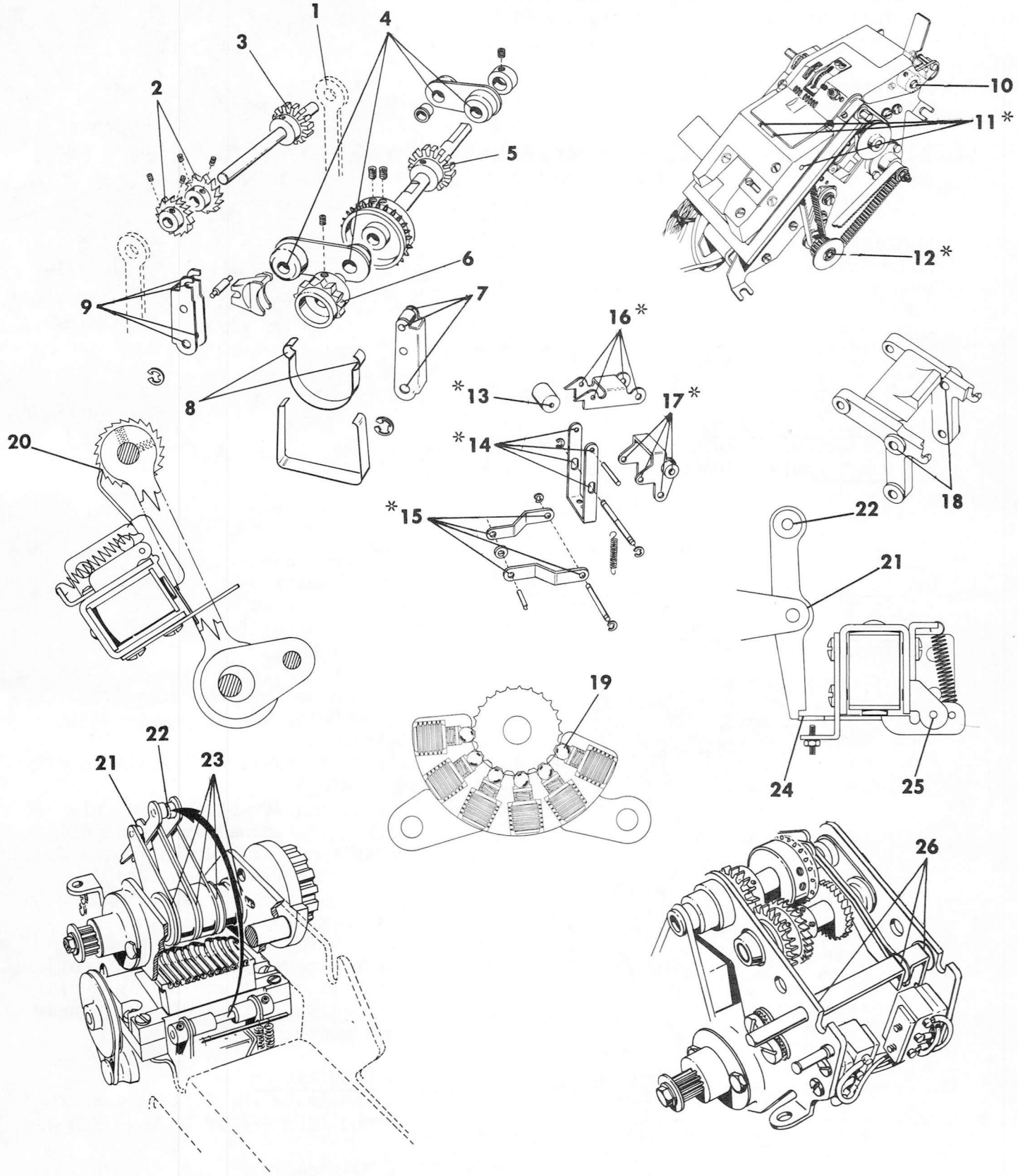
READER PREVENTIVE MAINTENANCE LUBRICATION CHART



* Does not apply to Model 552

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BASIC PUNCH MECHANISM PREVENTIVE MAINTENANCE

STEP 1 Preparatory Disassembly (Figure 1)
Remove Unit from Housing and remove the following to gain access to areas of Cleaning, Inspection and Lubrication:

(1) Punch Cover (3) Platen
(2) Tape Deflector (4) Chad Tube

(5) Forward & Reverse Index Magnet Screws, (to remove Magnet Assemblies on both sides).

STEP 2 Cleaning
Clean Unit as described under General Instructions (Page PM5-2).

STEP 3 Parts Check (Figures 1 & 2)
Check the following for worn or broken parts - Figure 1:

(6) Punch Driver Arms (wear at point of contact with Pawls or Punches)
(7) Punch Pawls (side play or wear at contact with Driver Arms and Over-centering Springs
(8) Punch Magnet Armature Links (side play)
(9) Punch Driver Arm Springs (wear at Anchor Points or weak Springs)
(10) Punch Pawl Yoke Spring (wear at Anchor Points or weak Springs)

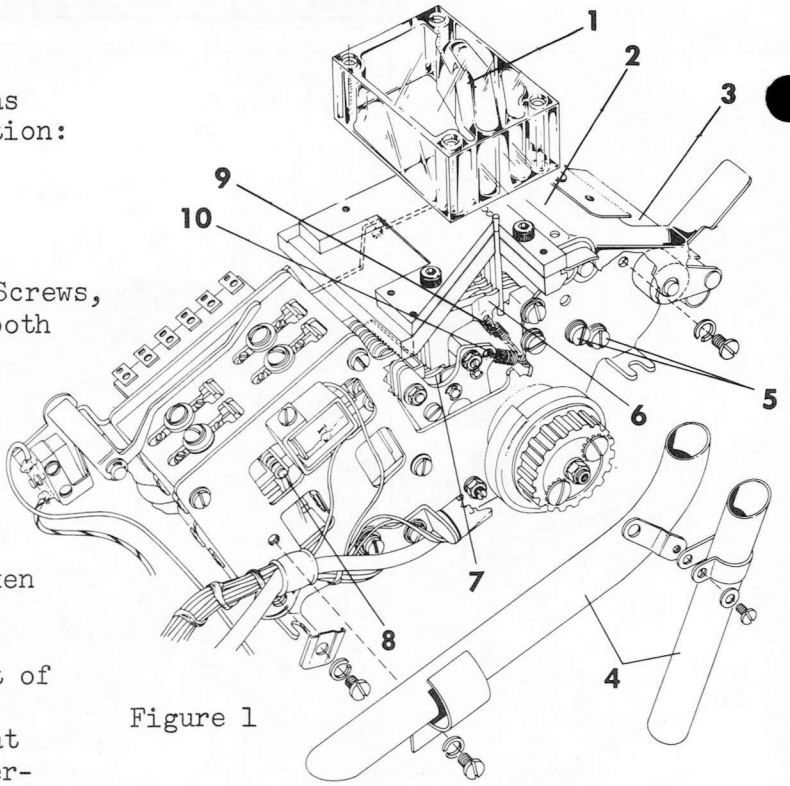

Figure 1

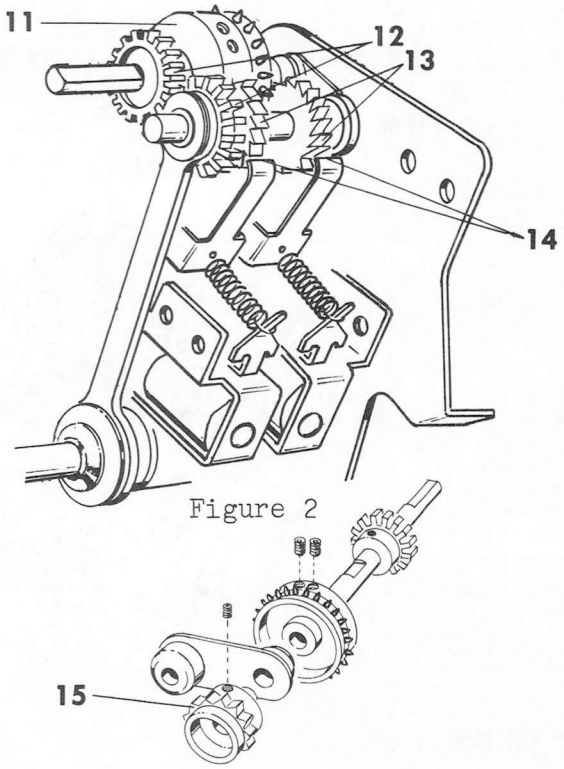

Figure 2

Figure 2:
(11) Sprocket Wheel
(12) Index Gears
(13) Index Ratchet Wheels
(14) Index Magnet Interposer Tips
(15) Detent Wheel

In addition to the preceding; visually check the Unit, with emphasis on the following:
1. Main Shaft Bearings (excessive play or binding)
2. Punches and Die Block (side play or wearing of Punches or Die Block)
3. Punch Magnet Armature Spring & Spacer (wear and correct location)
4. Wiring, Solder Points, Crimp Terminals (frayed wiring, insulation, etc.)
5. Input Pulley and Generator Disc (loose Screws, proper adjustment)
6. Tape Deflector Plate and Tear Plate (distortion, proper clearance and adjustment)

STEP 4 Lubrication
Lubricate the Unit as described and illustrated on Page PM5-7.

STEP 5 Reassembly
Clean and install the previously removed parts.

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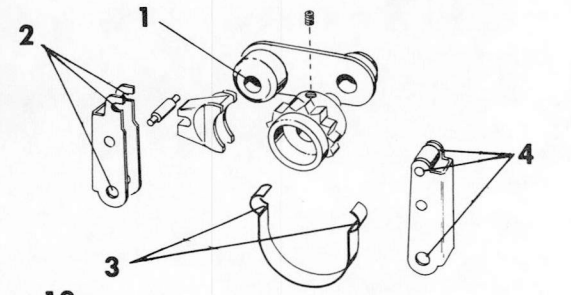
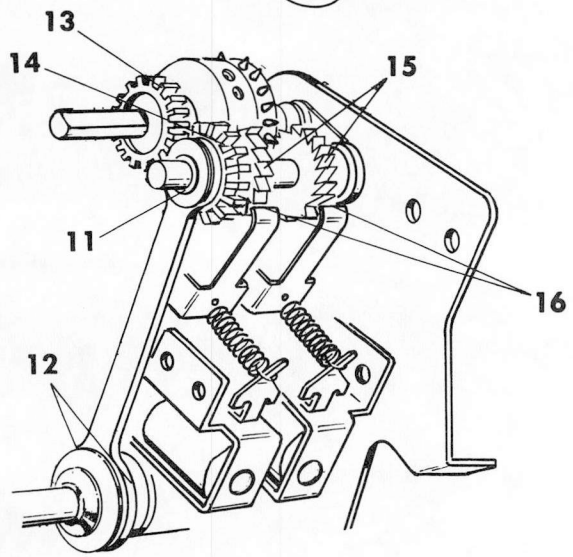
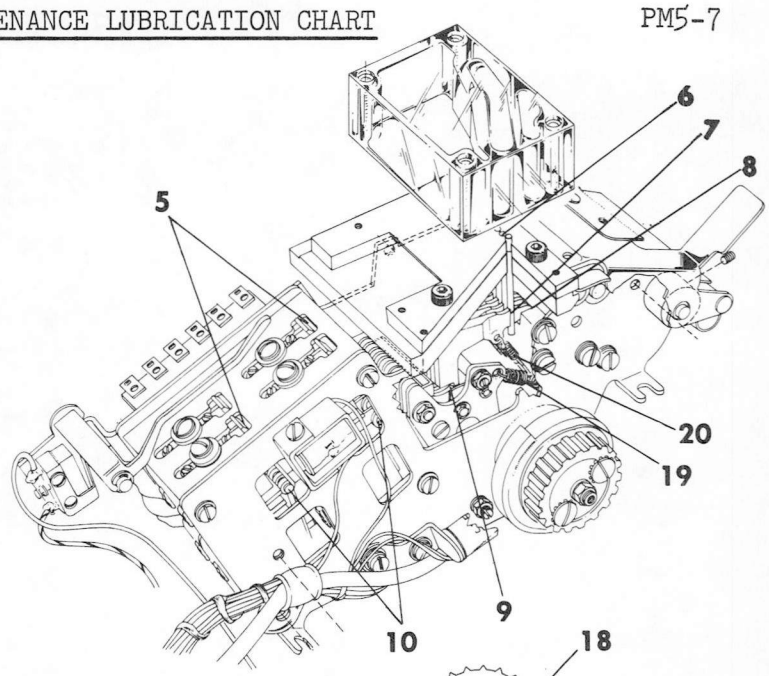
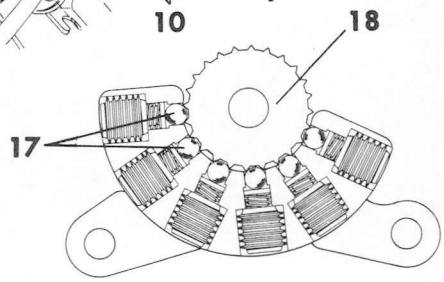
PUNCH PREVENTIVE MAINTENANCE LUBRICATION CHART









1. Ratchet Shaft Pivot Link - Custom Lube 700 inside hole and surface of Link.
2. Detent Arm Assembly - Custom Lube 700 in four holes.
3. Detent Spring - Custom Lube 700 at two points indicated.
4. Detent Arm and Roll - Custom Lube 700 on Roll and pivot point.
5. Punch Magnet Armature Spring and Spacer - Custom Lube 700 on both sides.
6. Punch Pin Guide Block - Custom Lube 700 very sparingly.
7. Punches - Custom Lube 700 top and bottom of slot.
8. Punch Driver Arm - Custom Lube 700 on side of Arms.
9. Punch Pawl and Driver Arm Contact Points - Custom Lube 700 on all nine points.
10. Punch Magnet Armature Link Pivots - Custom Lube 700 lightly on all nine pivot points.
11. Index Link - Custom Lube 700 on inside bearing surface, upper hole only.
12. Input Shaft Washers and Spacers - Custom Lube 700 on both sides of Washers and Spacers.
13. Sprocket Gear - Gulflex A on all teeth.
14. Ratchet Gear - Gulflex A on all teeth.
15. Feed Ratchets - Gulflex A on all teeth.
16. Index Magnet Interposers - Gulflex A Grease on tip of Interposers.
17. Ball Detent Assembly - Gulflex A Grease packed within entire recess of Housing.
18. Detent Wheel-Gulflex A on all teeth.
19. Punch Pawl Yoke Spring Anchors - Gulflex A Grease.
20. Punch Pawl Spring Anchor Points - Gulflex A Grease.

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February 1966

SPECIAL INSTRUCTIONS

RECORD OF PREVENTIVE MAINTENANCE

Unit Serial No.	Location	Date of P. M. 1	2	3